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Resolutions for the T.U.C.

SOME of the resolutions placed by member trade unions on the agenda of the Trade Union Congress to be held in Douglas, Isle of Man, next month, are in contrast with the relatively moderate tone of the T.U.C. Economic Committee recommendations; they show little concern for the economic situation or for the industrial responsibilities of the T.U.C. On productivity it is depressing to see the boilermakers criticising T.U.C. members of the British Productivity Council, to whose activities reference is made elsewhere on this page, for agreement to set up local productivity committees. The boilermakers state their erroneous view that productivity at local or workshop level is a question of wages and working conditions. It is much more than that: a question of every single worker in the industry apprehending the realities of the situation and the importance of his own part in putting in hard work or using his brains and initiative to devise means of increasing production. Four resolutions oppose any form of wages restraint. It is doubtful whether any worthwhile opposition will be offered to these at the Congress. The extent to which powerful unions have dis-

regarded the importance of wages restraint is shown by the claims of the three railway unions to be discussed with representatives of the Railway Executive today, and by that of the Federation of Shipbuilding & Engineering Unions, now under consideration. The National Union of Railwaymen also has tabled a resolution advocating greater participation by employees in the management and control of nationalised industries. Ample opportunity for making suggestions and for consultation and discussion between men and management of various aspects of railway working already exists on British Railways. Much of the credit for creating this and for encouraging its use must go to Mr. John Elliot, Chairman of the Railway Executive, for his work both in his present position and in his previous appointments as Chief Regional Officer of two Regions. It is doubtful, however, whether even the most enthusiastic advocates of workers' participation in management would claim, after experience in such participation, that more could be done to give railwaymen a greater voice in control of affairs, or that the management itself could be further relieved of its essential responsibilities.

British Productivity Council

EMPHASISING its impartiality to party politics, the British Productivity Council has given a preview of its latest venture in a pamphlet outlining the formation of local productivity committees. Before outlining the plan the pamphlet stresses the need for more production in the attempt to close the present gap between production and home consumption. Local committees in over one hundred towns and districts throughout the country are to be given the task of farming out the knowledge and experience gained by the B.P.C. during its participation in the Anglo-American Council on Productivity. As the parent body, the B.P.C., through these local committees, will try to promote more cohesion between management, employees, and trade unions, at the same time calling for the application of knowledge derived from technical research and capital. The latter, it states, can only be derived from savings. The B.P.C. is to provide facilities to the local committees in the form of lecturers, pamphlets, notes for discussion, and reasonable financial aid. It is also to enlist the services of the B.B.C. and television.

Consolidating the North Eastern Railway of India

THE North Eastern Railway, the predominantly metre-gauge system of the six railways of India as regrouped in 1952, is divided into three regions: Pandu, which incorporates the whole of the former Assam Railway, and Muzaffarpur and Lucknow, which cover districts of the former Oudh Tirhut and Bombay Baroda & Central India railways. Each enjoys a fair degree of autonomy under headquarters at Gorakhpur. Although it has virtually no gauge problem, the North Eastern has had many other difficulties to overcome. Diversity of topography and climate, differences of organisation and practice between the three constituent railways, inadequate workshop facilities, and the recent floods in the Brahmaputra valley, which did great damage to the main line of the former Assam Railway, all have complicated consolidation. The major new work is the Assam Link, completed between Partition in 1947 and regrouping of the railways, to avoid rail transit through Eastern Pakistan. Administration has been completely reorganised with departmental all-line line officers at Gorakhpur and a separate new electrical branch.

Withdrawal of Unremunerative Services

THE debate in the Commons last week on closing branch lines and withdrawing unremunerative services generally revealed a persistent ignorance on the part of some critics of British Railways. A short account is given in our Parliamentary columns. The burden of criticism is that withdrawal of services harms local communities, usually rural; that insufficient steps such as

dieselisation of passenger services are taken to make unremunerative lines pay; that bus services are not substituted for passenger train services withdrawn; and that local objectors have insufficient means of gaining a fair hearing. The Minister of Transport, Mr. Alan Lennox-Boyd, was quick to give the answers. He stressed the need for the railways to pay their way and stated that they already were saving £1,250,000 a year by closings, which might help them better to serve the millions who use British Railways; he outlined the economics of dieselisation, mentioning the high initial cost of motive power; and he explained the comprehensive machinery of committees which could hear objectors to proposed withdrawals. The problems of substitute bus services following the line from which passenger services have been withdrawn deserves closer study by objectors. What might have been emphasised is the usefulness of branches as feeders, more particularly in goods traffic. The answer is that railway managements are fully aware of this, which is one of the reasons for the relatively few withdrawals of goods train services, and then only after exhaustive inquiry.

Overseas Railway Traffics

CANADIAN PACIFIC gross earnings for May were (at \$3 to the £) £13,775,000, against £13,042,000 for May of last year, whilst net receipts were £579,000 and £586,000 respectively. For June, gross earnings were £13,583,000 (£13,073,000) and net receipts £759,000 (£865,000). Aggregate net earnings of the C.P.R. for the first six months of this year were £3,503,000, compared with £3,713,000 for the corresponding period of last year. Any increased revenue, therefore, that may have been derived from tariff increases since last year has been swallowed up by rises in working costs. Antofagasta (Chili) & Bolivia receipts through July have kept slightly ahead of the corresponding figures for 1952. For the week ended July 24 receipts were £105,875, against £84,247, an increase of £21,628. Currency receipts for the past few weeks of this year have been converted at about 340-345 Chilean pesos to the £, against 300-335 in 1952, whilst the boliviano conversion rate this year has been 538-14 against 169-61. No true comparison, therefore, is possible with last year's traffics.

Western Extension in Uganda

THE first section of a long-discussed extension in Uganda has been opened. It carries the main Kenya-Uganda line of the East African Railways 45 miles westwards from its former terminus at Kampala to Mityana. Ultimately the line is to reach the foothills of the Ruwenzori Mountains, where there are important copper mines, and Lakes George and Edward. The remarkably rapid survey of the whole route through difficult country was described in our December 14, 1951, issue. Construction of the Kampala-Mityana section has taken some 18 months and has been hampered by the swampy ground, the distance needed to convey earth for embankments, and scarcity of labour. There is already a dense population in the rich agricultural district traversed, but further extension will take the railway through a region which, although it has good land, is more thinly populated and awaits development. Its ultimate western terminus will also form a railhead for part of the Belgian Congo adjoining the Western Province of Uganda. Thus, although the first section has been guaranteed by the Uganda Government, from a long-term viewpoint the extension should yield a diversified and remunerative traffic.

Training for Management on the C.N.R.

THE Canadian National Railways employ some 1,100 supervisory officers, most of them due to retire within fifteen years. The need to replace them with men of equal competence and the expanding nature of the railways' business have led the management to organise a staff training course at Bishop's University, Lennoxville, Quebec. In outlining the scheme, Mr. S. F. Dingle, Vice-

President, Operation, C.N.R., has said that the aim is not to replace the knowledge which comes from study and experience on the job, but to provide a broader foundation and enable a man already skilled in one or more branches to participate in other affairs of the system. The C.N.R. has entered a "new railway-building era," with new lines under construction in Manitoba and British Columbia. Yards and industrial trackage are being extended, and the scope of services is widening to include more expeditious movement of all types of traffic. These developments, Mr. Dingle states, are creating new staff positions. The training scheme is a guide to the future. If it fulfils expectations, there is a prospect of setting up a full-time Canadian National staff college.

Classes of Passenger Accommodation

DISCUSSION by committees of the International Union of Railways of the adoption of two classes of passenger accommodation and the formation of two working parties to consider policy on sleeping and reclining berths, as recorded in our July 24 issue, may bring these matters to a head. The past seventy years have seen the original three classes—with, for a time, a fourth class on some systems in Central Europe—multiplied by the introduction of first, second, and third class sleeping car accommodation, first and second class *couchettes*, and first and second class Pullmans, besides purely local institutions such as the Spanish *butaca*. The several supplements for these relate to comfort; there are charges basically for speed, for use of specially fast trains or railcars; and fees are charged for reservation of ordinary seats and sometimes reservation fees are additional to the "comfort" supplement also. Furthermore, practice varies in different countries. Despite fairly recent developments such as the increase in third class sleeping cars and running of high-speed railcars, the tendency has been to simplify, as in abolition in some countries of first class for internal journeys. Nevertheless, the present complication and diversity add much to the cost of providing and maintaining rolling stock and to the costs of the operating and commercial departments, especially where through international working is concerned.

Simplicity and Comfort

FROM the selling aspect this complexity puts the railways at some disadvantage compared with bus, motorcoach, and air travel, despite recent developments in providing cheaper air passenger accommodation. There are signs that two classes suffice, at least for day railway journeys. How far the dearer class will be patronised in future is problematical in view of the small proportion even of second compared with third class passengers on most European railways. Some sort of luxury accommodation presumably always will be in demand in long-distance day trains that convey an appreciable business element. On the other hand, with road and air competition, the cheapest that the railways can offer must be comfortable. This is recognised in the practice now almost general of upholstering third class seats, though this step does not go far enough in countries with a high standard of living. Reclining chair cars may help to answer the need for cheaper sleeping accommodation by providing stock of relatively high capacity for day and night travel. Against this, they do not afford the privacy which Europeans find in compartment stock.

Unifying Gauges in South Australia

THE unification of gauges in South Australia has been brought a step nearer by the extension of mixed gauge to Mount Gambier, a pastoral and tourist district in the south-east corner of the State, which now can be reached by 5-ft. 3-in. gauge line direct from Adelaide. Trains from Adelaide use the Melbourne main line to Wolseley, 191 miles and close to the South Australian-Victoria border, whence it is another 114 miles to Mount Gambier. Although carried out as a domestic project, the conversion has an

inter-State importance as at Mount Gambier there was already a broad-gauge line leading into Victoria and worked by the Victorian Railways. Thus a second through route without break of gauge now is available between Adelaide and Melbourne. There are still over 1,500 miles of 3-ft. 6-in. gauge in South Australia. Apart from the three branches from the Wolseley-Mount Gambier line not yet converted, both the South Australian and the Commonwealth Railways operate important 3-ft. 6-in. lines in the north and west of the State, based on Port Pirie and Port Augusta respectively. Conversion from 3-ft. 6-in. to 5-ft. 3-in. gauge is without prejudice to the ultimate planned unification of gauges in the Commonwealth to 4 ft. 8½ in.

Scope for Dual-Voltage Locomotives

PENDING a decision on the system to adopt if the Wellington-Auckland main line of the New Zealand Government Railways is electrified, the various possibilities naturally provoke discussion in the light of the existing 1,500 V. d.c. Wellington suburban electrification. If a d.c. scheme were preferred eventually for the main line, the presence of this section need not rule out the choice of 3,000 V. It has been shown in the B.T.C. report on electrification of railways that no great complication is involved in designing equipments for operating on both voltages. With four-motor locomotives the 1,500 V. motors would be connected in series pairs for the higher or parallel for the lower voltage. With six-motor locomotives, four groupings would have to be provided instead of the usual three, the extra one being six motors in parallel for full speed on the lower voltage. At present 1,500 V. operation on the main line extends only over the 24½ miles to Paekakariki, so small a proportion that it need hardly be regarded as a governing factor in choosing the system for the remainder. Similarly it would not seem unreasonable to adopt 1,500 V. for a purely suburban scheme at Auckland although it might be preferable to use the main-line voltage if this were to be further extended as far as Frankton Junction.

Abolition

THE long-awaited statement by the Minister of Transport on the future of the British Transport Commission and its Executives was made on July 29. It has done very little to allay uncertainty as to the future transport organisation in this country. He announced the retirement of Lord Hurcomb and Sir William Wood at the end of this month, but he was unable to give any indication as to who will be the new Chairman. With the exception of London Transport, all the Executives are to come to an end on September 30. This step has been taken after consultation with the Commission, and in the Commission's view it will help it in the discharging of its duties. In some cases full-time members of Executives will continue to serve the Commission. The only person specifically mentioned was Major General G. N. Russell, Chairman of the Road Haulage Executive, but no doubt that exception was made because the Road Haulage Executive's business is most directly affected by the provisions of the Act and the Minister probably wished to give assurance of continuity in this case.

The uncertainty which surrounds the whole future of British Railways and the personal fortunes and prospects of numbers of railway officers, remains as great as it has been for many months. Some of the difficulties which the Minister has to face at the present time are understandable, and the courage and tenacity with which he has applied himself to a complex problem must evoke admiration. Probably not the least of his difficulties is to be found in the endeavour to reconcile Treasury and non-Civil Service remuneration for positions of great responsibility. However that may be, there can be no disputing the fact that the longer the present uncertainty is permitted to continue, the worse the effect on the general morale of transport officers of all kinds in this country.

Lord Hurcomb

IN direct and indirect ways, Lord Hurcomb, the first Chairman of the British Transport Commission, from which he is retiring on August 31, has exercised a considerable influence on transport in this country over the last 34 years. In the Civil Service—of which for most of his working life he was a distinguished member—the main policy decisions that are taken are political, but the advice the Government receives from the civil servant in the carrying out of that policy is all-important. In this way, from the first world war to beyond the second, Lord Hurcomb was closely concerned with transport affairs. This was particularly the case from the creation of the Ministry of Transport in 1919 and the formation of the four amalgamated railways in 1921 to the nationalisation of public inland transport in 1947. Then he was called on to take direct responsibility for the conduct of the State-owned transport organisation, and whilst most people will think of him in relation to that work of the last six years, it is probable that his influence before that as a Civil Servant was even more significant.

After a distinguished career at St. John's College, Oxford, of which he is an honorary Fellow, Lord Hurcomb entered the Secretary's department of the Post Office in 1906 and in 1911 became private secretary to the Postmaster General, Sir Herbert Samuel. Shortly after the outbreak of war in 1914 he became Director of Commercial Services in the Ministry of Shipping and on creation of the Ministry of Transport was transferred to it by Sir Eric Geddes, becoming the Permanent Secretary in 1927, and in 1938 he became the Chairman of the Electricity Commission. On the outbreak of the second war in 1939 he was appointed Director-General of the Ministry of Shipping and in 1941 the Director-General of the Ministry of War Transport. On the creation of the B.T.C. in 1947 he was appointed its Chairman. In 1922 he was created a Companion of the Bath, a Knight Commander in 1938, a Commander of the British Empire in 1918, a Knight Commander in 1929 and he was raised to the peerage in 1950.

This short record, and other honours conferred upon him on the advice of successive Governments and by other nations, is indicative of his great knowledge of transport by sea and land, and of electricity. Perhaps his greatest contribution to the nation was in the control of shipping during the two great wars. Hard on that was his indefatigable work in the last 34 years upon the vexed problems of inland transport. In his work as a Civil Servant and as Chairman of the British Transport Commission for the past six years, Lord Hurcomb was above all "thorough" and had the knack of quickly grasping the most complicated subjects and expressing them in simple terms.

Sir William Wood

SIR WILLIAM WOOD, who is also retiring from the British Transport Commission, began his railway career in the Accountant's Department of the old Belfast & Northern Counties Railway. This railway was acquired by the Midland Railway in 1903. It was in these early days that his outstanding ability began to be recognised. Before the first world war the Midland brought Sir William Wood specially to Derby to make the arrangements for introducing national insurance on the railway. When the Government took control of the Irish railways in 1917 he was appointed Secretary and later a member of the Railway Accountants' Committee set up by the Irish Railway Executive Committee. Always extremely shy, nevertheless he so impressed his superiors by his natural ability with figures that when the Ministry of Transport was formed in 1919 Sir William Wood was transferred to London as Director of Transport (Accounting) at that Ministry. It was then that he first met and worked with Lord Hurcomb. In 1924 Sir William Wood returned to the railway service as Assistant to the Accountant-General of the L.M.S.R. and the next year he first met Lord Stamp, who had then become President and later was

Chairman of the company. Stamp quickly recognised Sir William Wood's quality, and they formed an ideal combination, Sir William Wood providing the facts, figures and ideas, and Stamp using them in the shaping and exposition of policy with great effect. The two were quite dissimilar: Sir William Wood was retiring but with great creative gifts and a piercing wit; Stamp, benign, a born journalist, a most persuasive speaker and a capable administrator.

In 1927 Sir William Wood became Controller of Costs & Statistics, a position of junior-officer status in the L.M.S.R. hierarchy, and three years later he was straightaway appointed a Vice-President, without any intermediate step—an unusual course. In this position, in his prime, Sir William Wood made his greatest contribution to transport. In this period—between 1930 and 1939—the burden of railway administration was very great. Those years after railway amalgamation were years of great economic disturbance in the trade of the country, with their effects on the fortunes of a railway with public service to perform. The railways were closely regulated by Parliament, and Sir William Wood gave evidence before innumerable bodies on behalf of all of them. He was a most formidable witness, particularly on specialised railway matters, but his modesty and rectitude won him general admiration and respect. No one can say how many new ideas he originated which ultimately became definite plans—they were legion.

An Irishman first, all his working life Sir William Wood has retained an interest in Irish transport, and in the 'thirties he spent much time endeavouring to effect a stable system in Northern Ireland. He took his turns as Chairman of the British Railway General Managers' Conference. He was created a Knight Bachelor in 1937 for his services to transport. When the war came in 1939 he became a member of the Railway Executive Committee, which was the agency of the Minister of Transport for the conduct of the railways during the emergency. On the night of April 16, 1941, Lord Stamp was killed by enemy action. His tragic death was a great blow to Sir William Wood, who was then the senior Vice-President of the L.M.S.R. He succeeded Stamp as President of the L.M.S.R. in May, 1941, and thus took on the burden of supreme executive responsibility for the largest commercial enterprise in this country, in addition to his wartime duties as a member of the Railway Executive Committee. In 1943 he was elected President of the Institute of Transport and has contributed several outstanding papers to its proceedings. He was created K.B.E. in 1947 and later retired from the L.M.S.R. Two days after the Transport Act became law to "set up in Great Britain a publicly-owned system of inland transport," he was appointed a member of the British Transport Commission, the supreme body established under the Act to carry out the plan.

June Operating Results

THE sixth issue of *Transport Statistics* deals with the four weeks from May 18 to June 14, made memorable by widespread Coronation celebrations. Throughout the country the observance of public holidays curtailed the volume of production. British Railways originated only 20,481,000 tons of freight traffic, a decrease of 746,000 tons from 1952, or 3.5 per cent. Wagon loadings were down 141,000, or 5.4 per cent, and 18,755,000 fewer wagon-miles were worked, a fall of 5.6 per cent. The average wagon and train loads improved slightly, but that was in part due to a decline of 7.1 per cent in the number of wagons carrying light loads of merchandise. Though somewhat shorter than in June, 1952, the average length of haul was over 72 miles. Net ton-miles decreased by 66,250,000 (4 per cent), making possible a reduction of 589,000 in freight train miles. This cut of 5.6 per cent was spread over all Regions, while the five English Regions ran 405,000 additional coaching train miles.

When traffic volume contracts sharply, freight trains usually move faster, but in the June period the all-line

average speed of 9.08 m.p.h. compared with 9.17 m.p.h. a year ago. The loss of mobility was most marked in the Western Region, where speed dropped from 9.46 m.p.h. to 9.11, "wagon miles per train engine-hour" were 217 compared with an all-line average of 235 and "net ton-miles per train engine-hour" fell from 1,155 to 1,129, while the all-line average rose to 1,188. In contrast to the slowing down of freight movement, the all-line average speed for both steam and electric coaching trains was higher. For the first time the general average speed for electric services exceeded 20 m.p.h. The main credit for this advance goes to the Southern Region, which has registered over 20 m.p.h. for its electric trains each year since 1949 and now reports 21.12 m.p.h. for the June period.

RAILWAY PASSENGER TRAFFIC

In the month of May, British Railways originated 77,609,000 passenger journeys, an increase of 1,112,000 (1.5 per cent) on 1952, but 2,366,000 (2.9 per cent) below May, 1951. This year the number of journeys at ordinary full fares was 4,585,000 greater (31.1 per cent), but 2,434,000 fewer people took early morning or workmen's tickets, a decrease of 13.3 per cent, and other bookings were 1,039,000 less. The explanation is that railway full fares outside the London area were reduced on May 1, 1952, when monthly return fares were cancelled. First class journeys in May numbered 1,483,000, an increase of 30,000 (2.0 per cent), but the average fare was about 7d. less and total receipts decreased by £24,000 (2.3 per cent).

London Transport railways carried 49,828,000 passengers in the 4 weeks to June 14, an increase of 6,668,000 (15.5 per cent). The increase was entirely in passengers taking ordinary tickets and involved the running of 636,000 extra car miles (3.8 per cent).

ROAD TRANSPORT

In the June period, British Road Services carried 2,895,000 tons, a decrease of 224,000 tons (7.1 per cent); they ran 48,370,000 vehicle miles, a decrease of 4,297,000 (8.1 per cent). Road Passenger Transport recorded 179,934,000 journeys, a decrease of 5,112,000 (2.8 per cent). The Tilling Group lost 3,712,000 passengers (3.0 per cent), but saved 160,000 car miles (0.5 per cent). The Scottish Group carried 1,400,000 fewer people (2.3 per cent), but cut its car miles in the same proportion by 341,000.

London Transport carried by road 294,527,000 passengers, an increase of 5,283,000 (1.8 per cent). It ran 33,370,000 road car miles, a decrease of 192,000 (0.5 per cent). Altogether by rail and road London Transport moved 344,355,000 people, an increase of 11,951,000 (3.6 per cent). The average receipt per journey was slightly lower, both by rail and road, restricting the rise in total receipts to 2.7 per cent. Working expenses would be heavy during these abnormal weeks, and London Transport may not have been recompensed adequately for valiant efforts to cope with great crowds of sightseers.

AGGREGATES FOR 24 WEEKS

Tables of aggregates for 24 weeks to June 14 form a valuable section of No. 6 of *Transport Statistics*. These show increases of 1,966,000 tons in originating freight train traffic (1.5 per cent) and of 44,001,000 in net ton-miles (0.4 per cent), accompanied by decreases of 164,000 in wagon loadings (1.0 per cent) and of 7,646,000 in wagon miles (0.4 per cent). Freight train miles were reduced by 344,000 (0.5 per cent), while coaching train miles increased by 1,425,000 (1.4 per cent). Freight train engine hours in traffic were almost unchanged, but freight engine shunting hours were cut by 239,000 (3.0 per cent); coaching engine hours were up 91,000 (1.0 per cent).

An outstanding weakness in the results was a decrease in merchandise forwardings of 1,474,000 tons (6.1 per cent). Last year British Railways carried 3,015,000 fewer tons of merchandise than in 1951 (5.7 per cent) and British Road Services lost 5,012,000 tons of traffic of all kinds (10.6 per cent). The British Transport Commission annual report suggested that "the fall in the tonnages of the higher rated classes of merchandise by freight train, and in the tonnages of the roughly corresponding types of goods which

proceed by British Road Services, is ascribable in the main to the reduced production of consumer goods during the year 1952." A similar explanation cannot apply to the further losses in 1953. During the 24 weeks to June 14, British Road Services lost 1,814,000 tons of traffic (9.0 per cent) and the small quantity of general merchandise passing by Inland Waterways decreased by 252,000 tons (12.7 per cent). It is hard to resist the conclusion that many traders do not care for the State-owned undertakings and are developing other means of transport on an extensive scale.

Traction Tests with Compound Motors

ALTERNATIVES to the series motor for traction have been of limited number. Repulsion motors have found some application on the Continent, and were used in the first motor coaches for the L.B.S.C. alternating current electrification. The three-phase motor had a period of ascendancy in early Italian electrifications, but today is of interest mainly for its possibilities in converter locomotives designed to run on 50-cycle systems. In d.c. practice the search for a wider range of characteristics than is provided by series/parallel control and moderate field-weakening has been in the direction mainly of extended weak-field operation, or of motor-generator schemes. Recently, however, a practical study has been made in Italy of traction with compound motors having a separately-excited winding in addition to the normal series field. The investigation took the form of dynamometer car trials on goods and passenger trains with two class "E.424" Bo-Bo locomotives, one with ordinary series motors and five weak-field steps (minimum field 35 per cent), and the other with compound motors having separate excitation as described above. Results and conclusions derived from these experiments have been described in the electric traction edition of the *Bulletin of the International Railway Congress Association* by Dr. Ing. M. Diegoli and Dr. Ing. S. de Paolis.

In the locomotive with compound motors the four separately-excited fields were connected in series across the output of one of the motor-generator sets, which happened to be of greater capacity than was required for normal battery-charging and control service. Rheostatic control of the generator field provided eleven degrees of excitation, selected by a handwheel added to the normal controller. Reducing the excitation had the same effect on speed and tractive effort as normal field-weakening. The reverse operation could be carried out until, at a certain point, the series field and armature currents were reduced to zero and then reversed, so that the traction motors began to regenerate.

With the compound motor system a wider economic speed range at low tractive efforts was available than with plain series excitation, and the outstanding characteristic of the locomotive equipped in this way was the very close control of speed possible, with occasional periods on the test route of short spells of automatic regeneration as the driver operated his excitation controller to hold the speed steady on falling gradients. It is considered, however, that such accuracy is a refinement for normal traffic working and that the five-step weak-field system is adequate to permit observance of schedules. The chief advantage of speed control within such fine limits would be found in close adherence to a permitted maximum when regaining time.

Some stress is placed in the report of the investigations on the automatic changeover between motoring and regeneration. This is also a characteristic of regenerating with separate excitation of normal series traction motors, and trains may be started away from stations on predominantly downhill sections with the locomotive in the regenerative connection, so that electric braking becomes effective at once. With the compound system described, however, the locomotive can give the full series starting performance when necessary and then pass into regeneration without any change of H.T. connections. Considering

all the characteristics of the locomotive with compound motors, the conclusion is reached that the system would merit installation in certain cases where limited field-control has been found insufficiently flexible.

Improvements in Malaya

ENTERPRISE and tenacity are shown in the continuance of the work of improving and developing the Malayan Railway throughout the present emergency in Malaya, and of completing repairs to lines and installations damaged or destroyed in the war of 1941-45. The doubling in size during the past year of the main marshalling yard at Kuala Lumpur, the Federal capital, besides the centre of the system, and the improvements made to the layout and capacity of yards at other places show the management to have a lively faith not only in the economic future of Malaya but also in the ability of the railway, under the constant threat of road competition, to carry its proper share of the traffic derived from expansion of the economy of the Federation.

Good progress also has been made in increasing traffic handling facilities at Port Swettenham, the railway port at the mouth of the Klang River, 27 miles from Kuala Lumpur, where a record tonnage was dealt with in 1952. Despite measures to cope with growing traffic, such as additions to the lighter fleet, increased transit shed space, and introduction of mechanical horses, fork lift trucks, and a mechanical conveyor, the present port has proved too small for its traffic and there is no room for expansion. After an investigation by a committee appointed by the Federal Government, construction has been approved in principle of three deep-water berths accommodating all classes of ocean-going vessels, with transit sheds, about three miles from Port Swettenham; five years is estimated as the time needed for completion of this project after funds have been made available.

The principal development in rolling stock has been additions to the wagon fleet. Many of the 600 and more wagons, half of them bogie stock, ordered in 1950 and 1951 from United Kingdom builders, now are in service. Further orders are being placed through the Crown Agents for the Colonies, and it is hoped within three years to replace all the military wagons, designed for a short life, taken over from the army after the war. Diesel traction is closely studied and adopted where necessary on its own merits; six diesel-hydraulic locomotives with Voith-North British transmission ordered from the North British Locomotive Co. Ltd. in 1952 are expected to be delivered early next year to give additional shunting power in yards. The high standard of passenger accommodation of the pre-war period is being restored. The day mail trains between Singapore, Kuala Lumpur, and Penang include air-conditioned buffet cars; and air-conditioned sleeping cars are expected to be running shortly in the night mails, which latter trains were restored between Singapore and Kuala Lumpur last September as the result of the decline in terrorist attacks on the railway. Prewar standards are being bettered in the case of second and third class coaches, as in the replacement of wooden by steel tubular seats upholstered in plastic cloth.

A major work of restoration has been that of the 300-mile East Coast Line, of which some two-thirds of the track were removed during the war and the many larger bridges demolished. Relaying of track and restoration of bridges and stations began in April, 1947, and work proceeded despite terrorist activity; a special track-laying machine was built and used on construction northwards. The northward and southward construction parties met on May 31 last and the line was officially reopened a few days ago by the High Commissioner, General Sir Gerald Templer. Through running is again possible from Singapore to Kota Bharu on the East Coast without further necessity for the detour by the main line along the West Coast and round through Siamese territory. It will be some months, however, before improvements to the track and roadbed allow of prewar speeds.

LETTERS TO THE EDITOR

(The Editor is not responsible for opinions of correspondents)

Hot Boxes on Freight Wagons

July 24

SIR,—We read with considerable interest the *résumé* in your July 10 issue taken from the Bulletin No. 406 published by the Engineering Experimental Station of the University of Illinois, U.S.A.

There is one point that is not brought out here, and that is, that most American railways use cotton waste for axlebox packing, which undoubtedly accounts for the larger part of their trouble. Firstly, the lack of natural resilience, and secondly, the danger from fluffing.

English railways, on the other hand, and also many British and foreign systems, use a worsted or wool or a mixture of the two sometimes blended with hair and, where these materials are used, the above disadvantages are reduced to an absolute minimum and has, over a large number of years of usage, given exceptionally good results.

Yours faithfully,

C. F. LANE

E. Illingworth & Co. (Bradford) Ltd.

The Harrow Accident

July 27

SIR,—In criticising, in your July 24 issue, my letter on this subject, would Mr. Courtenay Barry please state his experience in train and signal working, in order that your readers may assess the value of his views?

My own covers a lifetime on railways at home and abroad, in which I was for many years responsible for inquiring into all train accidents on the greatest railway in South America. I never knew a collision occur where the distant was rigidly observed as a stop signal. If a driver overran it, even by half a train length, he was immediately reported.

Yours faithfully,

E. R. B. ROBERTS

Eynesbury, Huntingdonshire

July 18

SIR,—That the late driver R. S. Jones of the up Perth express saw the Harrow No. 1 up fast distant signal at caution and immediately arranged to check speed and stop if necessary at the Harrow No. 1 up fast outer home signal, is shown by a photograph (No. 3) in the official report. The blower valve was open, the regulator shut, the reversing screw in forward gear at 60 per cent cut off, the steam sanding valve open to sanding in front of the coupled wheels, and the driver's brake valve handle was in the position for emergency brake application with the dead driver's hand still gripping the brake handle after the collision.

The cause of the fatal delay in brake application by Driver Jones was, I think, the accidental snapping off of the bottom drain cock on the left-hand middle water gauge cock by the fireman.

Whilst testing the water level in the boiler for his driver the fireman, finding the drain cock handle hard to shut, struck the handle with a tool. Because of the oscillation of the footplate he must have missed once and struck the cock, causing it to break off; this is shown in photograph No. 3—a broken cock with handle half shut.

The sudden release of a high-pressure water and steam jet blowing downwards, a part of the jet glanced off the left-hand injector steam pipe in front of the driver when he was about to apply the brake. The doctor's report in the official report states that "there were indications that Driver Jones had taken a few breaths of steam laden with carbon monoxide before he died." The sudden rush of

steam and water at high pressure from the middle water gauge cock prevented the fireman from reaching the handle on the left top water gauge cock, which shuts after the top and middle cocks.

Also, the driver, engulfed in hot steam, would be concerned with the safety of the train. Even whilst he was in this formidable situation and was suffering much, the final emergency brake application by the driver caused rapid application of the steam brake on the engine and tender and surging of the train until the train brake was applied. The prompt action of Driver Payne of the local train in releasing his brakes lessened slightly the full force of the collision, thus saving a higher casualty list. If my theory is correct Driver Jones died a hero at his post and not a culprit.

In answer to Mr. E. R. B. Roberts, whose letter was published in your July 17 issue, may I point out that Harrow No. 1 up fast distant signal is 2,012 yd. from the point of collision; the time factor therefore is nearer 80 than 20 sec. As to possible failure of the engine brake, the evidence of the guard of the Perth express is that the brakes worked efficiently as far as Watford Tunnel.

Yours faithfully,

T. LAWRENCE

27, Church Street, Harwich

Courses for Ticket Collectors

July 27

SIR,—I was interested to read in your July 17 issue of the courses for ticket collectors in the North Eastern Region.

It is to be hoped that due attention was paid to their prevalent habit of standing in the doorway of a compartment so that the people in the outside window seats have to stretch across their neighbours to hand their tickets to the collector. It may save the collectors' time but never fails to annoy.

Yours faithfully,

J. C. ALDRIDGE

23, The Ridge, Coulsdon, Surrey

Diesel and Steam Locomotives Compared

June 29

SIR,—As a former steam motive power foreman for many years on one of our Eastern railroads serving the New York City area, with heavy freight and suburban traffic, may I comment on steam *versus* diesel arguments?

Your correspondent Mr. E. C. Poultny might have mentioned in your April 17 issue, that the data he supplied on New York Central steam and diesel locomotive drawbar pull and drawbar horsepower were published by Mr. Paul W. Kiefer, formerly of the New York Central, in "A Practical Evaluation of Motive Power"; Mr. Roger Boland's fuel cost and maintenance cost figures for modern steam *versus* diesel locomotives also are in that book. They are based on New York Central Railroad test data compiled with scrupulous objectivity.

The unmatched performance of the New York Central "Niagara" class steam engines has been soft-pedalled by a management which seemingly is out to please the diesel merchants. Therefore the coal burning "S" steamers were handicapped even in 1946 by having to burn inferior run-of-the-mine coal.

The maximum annual locomotive mileage figures which Mr. Kiefer gave for diesel power, 324,000 miles, nowadays can no longer be obtained with New York Central passenger diesels. Since the costly Muncie (Indiana) diesel wreck caused by a large portion of a locomotive driving wheel being separated from its main body, the Interstate Com-

merce Commission recommended that diesel locomotive wheel inspections be carried out every time the brakes are tested. At terminal points New York Central passenger diesels have to lay over now for wheel inspection, so much so, that the diesel locomotive availability and high monthly mileage figures have now come down to modern steam locomotive levels.

For the first five months of 1953 the net income of the dieselised Pennsylvania Railroad was only \$15,000,000 out of a gross of well over \$430,000,000. Yet it has been asserted with a straight face by presidents of our most important railroads that the diesel locomotive is the greatest single advance in railroad engineering, which ever has made its appearance.

Really modern American coal-burning steam locomotives, such as the Nickel Plate well-maintained "Berkshires," which handle 90 per cent of that road's freight, made it possible for Mr. Lynn White, its President, to declare an extra 10 per cent dividend as a reward to stockholders for withstanding pressure from diesel manufacturers. As the initial cost of a "Berkshire" is less than half the \$600,000 cost of a four-cab unit diesel of 6,000 b.h.p., the Nickel Plate record net operating income is not subjected to the siphoning annually of millions of dollars to pay off maturing instalments on diesels.

The rapid dieselisation of U.S.A. railways is primarily a big financiers' manipulation, in most cases divorced from

operating benefits to the stockholders and the public, as shown by the ever-increasing curtailment of passenger services which the dieselised carriers demand. The steadily decreasing ratio of net income to gross receipts, and simultaneous growth outstanding equipment obligations incurred largely for diesel purchases belie the oft-repeated claims of diesel economies.

Diesel advocates outside the U.S.A. stress the phenomenal sales volume to U.S. roads of this form of motive power; but the very strong economy of the United States can withstand much punishment which would be fatal to less fortunate countries. Moreover in view of our vast road and air transport and pipeline developments, our railroads can already be considered as expendable in a real pinch.

As a corollary to the intrusion of oil burning diesel locomotives into the Appalachian coal mining districts to haul coal, the nearly 100 years' marriage of convenience between railroads and the coal mining industry is headed for the rocks. The Pennsylvania Railroad for instance, finds itself confronted with a new threat to its coal hauling business. The coal mining industry is now trying hard to lower the high rail transportation cost of coal, and experiments are being carried out with coal pipe lines, for crushed coal slurry over long distances.

Yours faithfully,

JOHN LYNCH

Wharton, New Jersey, U.S.A.

Publications Received

Directory of Railway Officials & Year Book, 1953-54. London: Tothill Press Limited, 33, Tothill Street, Westminster, S.W.1 $8\frac{1}{2}$ in. \times $5\frac{1}{2}$ in. 530 pp. Price 40s.—The present volume is the last to show nationalised transport in Britain in its present form, in view of the statement last week by the Minister of Transport that, with the exception of London Transport, the various Executives of the Commission would not continue after September 30 next. Fundamentally there has been no change in the method of presentation in the current edition, but it has been found possible by typographical economies to reduce the number of pages slightly without sacrificing any information. All entries continue to be divided into one of two main divisions, namely, British Commonwealth (regardless of Dominion or Colonial status) and Foreign: each of these sections is again sub-divided geographically into continents and countries. The directory affords a unique corpus of statistical and other information on railways in every part of the world.

Once again it has proved impossible to secure reliable information from most of the "iron curtain" countries of Eastern Europe. For the first time it has been possible to give extensive details of the personnel and reallocation of lines resulting from the reorganisation of the Indian railways. New entries include those for Cambodia and Viet-Nam.

The statistics specially prepared for this volume by the British Transport Commission, in replacement of the former Ministry of Transport statistical returns of railways in Great Britain, are included once again. Maps are included of the Divisional Water-

ways Organisation and of the Road Haulage Divisions in their present form. The Transport Act, 1953, embodying the outline of the revised organisation of nationalised transport, including disposal of part of the Road Haulage Executive undertaking, and providing for preparation of a scheme of reorganisation for British Railways, was passed shortly before the directory went to press.

British Iron & Steel Research Association.—The British Iron and Steel Research Association has recently issued an illustrated pamphlet containing details of the second annual survey on some of the results of research in the iron and steel industry. The subjects include hot dip methods of coating steel with aluminium, properties and design of ingot moulds, adaption of the joystick principle for crane controllers, and other subjects of interest to the iron and steel industry. The various subjects are treated in considerable detail, the object of which is to bring to the iron and steel industry's attention some of the research results, now ready or nearly ready, by which means it is considered substantial savings can accrue.

Heat Treatment of Aluminium Alloys. The Northern Aluminium Co. Ltd. has issued a revised edition of its publication "Heat Treatment of Aluminium Alloys" first issued in 1948. Opportunity has been taken to revise the book in the light of five years' experience, and of adding many new photographs, but the aim and pattern remain the same, offering in a simple manner, practical advice on the solution treatment, precipitation treatment, and annealing of aluminium, with sufficient theory to give a better understanding of the principles underlying practice. Description of the procedures employed and the

equipment used in all the different forms of heat treatment is illustrated by photographs, and some ten pages of tables provide a ready guide to the recommended and specified treatments for the various Noral alloys.

Vybak Rigid Sheet.—Vybak rigid sheets, made from vinyl chloride-acetate and polyvinyl chloride resins, are produced in a wide range of thicknesses and variety of colours and surface finishes suitable for calculating instruments, moisture-proof packages, nameplates, dials, electrotypes, moulds, printing plates, and so on. An illustrated brochure has recently been issued by Bakelite Limited which contains much information relating to the machining of this material, chemical resistance tables, electrical properties, forming, and other details.

Swiss Federal Railways 6,000 h.p. Locomotive.—A joint publication of the Swiss Federal Railways, Swiss Locomotive & Machine Works, Winterthur, and Brown, Boveri & Co. Ltd., Baden, describes and illustrates the two recent 6,000 h.p. Co-Co locomotives for the Gotthard line which were the subject of articles in our November 28 and December 26, 1952, issues. Previous locomotives for the same service are referred to in an introductory chapter dealing with the development of motive power on the route, which sets out the service requirements of the present design and includes a gradient profile. The mechanical and electrical features of the Co-Co locomotives are dealt with in detail, accompanied by illustrations of many of the component parts and assemblies. There are dimensioned general arrangement drawings, a simplified main circuit diagram, and performance curves for motoring and braking.

THE SCRAP HEAP

Sea Water by Rail

When one reflects on the type of service given by the nationalised railways it is interesting to read that the Great Eastern used to deliver a large can of sea water at any address in London for 6d., calling next day to fetch the empty can without extra charge.—*From a letter to the "Evening Standard."*

[The sea water was brought from Lowestoft, usually in wooden kegs.—*Ed., R.G.*]

To End Travel Worries: 2s.

A British Railways check-up shows that fewer than one in ten going abroad use the registered baggage facilities. Nearly all toil with their luggage, pay exorbitant tips and have wearisome waits at the Customs sheds. British Railways point out that with the registration system two passengers with two suitcases containing 132 lb. of luggage can have them transported to Paris for a total extra charge of 2s.—*From "The Star."*

Request Stops

A correspondent suggests that Yeoveney, on the West Drayton to Staines branch of the Western Region, now must be one of the few request stops on that Region; Lydstep Halt, on the Whitland to Pembroke Dock branch, between Tenby and Manorbier, is another that comes to mind. He points out that Yeoveney is used by only one or two passengers a day and is responsible for what seems an unusual instruction to engine drivers that they should "keep a sharp lookout for passengers." An evening train always stops there, and the guard gets out and lights the station lamps.

Ichabod

The paradox of a port without ships and a railway without trains was created in the Omeath peninsula, in County Louth, at the beginning of last year when the harbour of Greenore and the Dundalk, Newry, & Greenore Railway which served it were closed to all traffic. . . .

It's not surprising that the people of the peninsula, seeing the weeds rapidly overgrowing the railway track and the rusting signals set suggestively at danger, should hark back to the relatively great days of the port of Greenore and wonder why change has come in this case to mean also decay.

Since 1933 the railway had been worked by the Great Northern Railway (Ireland), but it kept its old passenger stock and also some of its locomotives, notably the *Macrory* and the *Dundalk*, two of the six saddle-tank engines built at Crewe in 1873 for the broader gauge of the Irish lines.

The D.N.G.R. was in its closing years the only line in these islands on which one could still see coaches wearing the much-faded livery of the L.N.W.R.,

"purple brown, and spilt milk, lined with yellow," to quote the official description. They never attained the crimson lake of the L.M.S. Now, like the port of Greenore, they belong to history. — *From "The Manchester Guardian."*

Token Payments

It is reported from New York that shops are to stop selling toy money for the next fortnight while the city's underground fare turnstiles are adjusted. Nearly 2,000 toy and foreign coins have been found in turnstile slots.

The standard fare has gone up to 15 cents (1s. 1d.). So the turnstiles are to be adjusted so that they will take only 15-cent token coins on sale at stations.

Anticipation ?

The photograph reproduced below of a recently repainted notice board has been sent us by a correspondent. The



Photo]

[P. Norris

Repainted notice board on Hamworthy Goods Branch, Poole, Southern Region

board adjoins a level crossing on the branch from Hamworthy Junction to Hamworthy Goods (Poole), Southern Region.

Railway Competition

The introduction of railways has conferred incalculable benefits on this kingdom, but those benefits have been accompanied by a very great amount of disappointment to the public and distress to the proprietors. Unfortunately, the state of the science of political economy did not enable it to keep pace with the rapid advances of mechanical and physical knowledge.

As long as the map of England lay untouched before the railway speculator, his interests and those of the pub-

lic were identical; but, once committed to a line, the foundations of an interest adverse to the public were laid; and, the longer the trunk and the wider the branches of every railway became, the more were the directors and proprietors compelled to look at every fresh undertaking as a means of propping up an existing interest rather than of serving the public at large, and the wider became the divarication between the interests of the nation and the interests of the company. . . . The proprietors of railway stock are computed to have squandered seventy millions of money in Parliamentary contests, and to have obtained leave to make lines to the value of forty millions, which they have been only too glad to relinquish.—*From "The Times," July 27, 1853.*

Aid from Advertisers

Why all this fuss about and against commercial television? Has any London looker-in ever considered how much higher Underground fares would be and how much poorer London Transport service would be were it not for the thousands of pounds, poured annually into London Transport coffers by advertisers?

These patrons of the arts not only give us cheaper travel, but make "picture galleries" of trains, tubes, escalators and buses.—*From a letter to the "Evening Standard."*

Round the Station

They're Wonderful !

Regard these mastodons in blue,
Who pad the hoof the long day through!
They patiently befriend commuters,
They put the wind up luggage-looters
And, in these days of grab and smash,
Safeguard the booking-office cash.

We see them there, we see them here,
Keeping communications clear,
Equal to any situation
When queues spill over from the station,

Yet tolerating with a smile
The engine-spotting juvenile.

It seems these potent pachyderms,
Immune alike to cold and germs,
By draughts unmoved, exposure-proof,
To parking optimists aloof,
Contrive constabulary fun
By keeping taxis on the run.

We know them well, these mighty men,
We give them greeting, now and then;
Maybe we think them ponderous,
But mark the paucity of fuss,
As, with inexorable zest,
They speed the uninvited guest !

Salute to every constable,
Traditionally wonderful,
Although the 'flash' fraternity
Would blasphemously disagree
And add that, from their point of view,
Distance would lend enchantment, too !

A. B.

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

SOUTH AFRICA

Increase in Rates Surcharge

The surcharge of 10 per cent on freight rates imposed on April 1, 1950, was increased to 25 per cent on August 1.

Express Goods Services in South Africa

The express goods services experimentally introduced between Johannesburg and Cape Town on May 1 seem likely to prove successful, for business houses are making increasing use of them. A census of the traffic handled during the first two weeks since the scheme began shows that perishables are providing large consignments, but a great variety of other goods also is being sent.

Goods have been delivered at the receiving end on the third day after acceptance at the forwarding station. Firms are seizing on the advantages of this quick transit. One on the Reef is bringing goods from its factory to Kazerne for despatch. Another, in Johannesburg, is considering sending its goods to Cape Town by the service and arranging for the appointment of an agent there to receive it and arrange re-despatch to other destinations.

Senders must endorse their consignment notes and mark their goods specially. Goods must be at Kazerne (Johannesburg) not later than 11 a.m. on the day of despatch and before 4 p.m. at Cape Town goods sheds. As the main aim of the service is speed, consignments are being accepted only for end-to-end traffic; that for intermediate points must travel by ordinary services. The extension of this service between other centres is under consideration.

Orange Free State Improvements

General expansion of industry in the Free State, the new Sasol oil-from-coal project at Coalbrook, the gold fields, and agricultural development have made it necessary to undertake large scale railway improvements totalling £14,000,000 in cost. The main line between Bloemfontein and Kroonstad is no longer able to carry all the traffic and doubling between Van Tonder and Bosrand, 111 miles, has begun. The total cost will be about £4,153,000. The 25 miles between Kalkvlakte and Bosrand have been completed and the section is in use. Work continues on the Van Tonder-Glen, Glen-Karree, and Karree-Brandfort sections.

Between Karree and Brandfort the line is being doubled on its existing location, and the work should be completed in a few months. A new station is being erected at Brandfort. At Bloemfontein a new marshalling yard is under construction. A nine-mile extension of the Odendalsrus line to Aandenk (Allanridge) has been completed, except for ballasting. The cost will be about £370,000. The yard at Gunhill has become too small to cope

satisfactorily with the traffic and a large new marshalling yard is to be built on a site two miles from the existing yard on the northern side of the Vals River at Kroonstad. The earthwork of this yard has been put out to contract at a total cost of £88,371. Progress is being made on the deviation of the main line between Cronnel and Kalkvlakte. Work on this section includes a new station at Virginia and a high level crossing of the Sand River with heavy earthworks. It is expected that this section will be completed early in 1954.

At Bloemfontein Works additional shops, costing £4,825,000, stores buildings (£550,000), machinery (£1,557,370), and electric light, and power for workshops (£425,000) are planned. A new permanent way reclamation shop at Bloemfontein will soon be in operation.

CHILE

Underground Railway for Santiago

The Government has published a decree authorising the raising of internal or external loans to the equivalent of 5,500 million pesos to finance the construction of an underground railway in Santiago. No call for tenders has yet been made.

ARGENTINA

New Diesel Stock

Four more Ganz diesel-mechanical units have arrived in Buenos Aires by the *Rio Primero*. Twelve are already in service on the General San Martín Railway and another twelve have yet to be delivered.

The local agents of General Electric of America, have announced that 25 diesel-electric locomotives for the broad

gauge will arrive in October. Three further 1,625 h.p. broad gauge diesel-electric locomotives built by Baldwin Lima-Hamilton have arrived in Buenos Aires on the *Rio Aguapey*.

Standard Rule Book

The State Transport Undertaking has approved a new code of rules for railway operation, replacing those previously in force on the various systems. The new book comprises 584 articles under 15 headings.

New Sleeper Plant

A model plant for the preparation and impregnation of sleepers is to be erected at Villa Constitución.

ITALY

New Porta Nuova Station at Milan

Porta Nuova Station, the old terminus at Milan of some electrified lines of local importance, which is located close to the Central Station but at right angles to it, was closed some time ago and is now being demolished. A new terminus is to be built on the site and traffic has been diverted to Milan Garibaldi Station for the duration of the work.

Reconstruction of War-damaged Lines

During the war the Montepescali-Asciano line, which links the Mediterranean coast between Rome and Pisa with Siena, was severely damaged, and its northernmost section, from Monte Antico to Asciano, 32 miles, completely destroyed, with 30 bridges and viaducts and six tunnels. This line has now been reconstructed at a cost of 605 million lire. The line is of importance

Transport in Madagascar



Photo]

[F. H. Worsfold

An 0-4-4-0 wood-burning locomotive with four-wheel tender built by Baldwin in 1916 on a goods train from Tamatave to Anivorano at Ambila-Lemaitso, Madagascar Railways

in the transport of minerals from Central Tuscany to the Mediterranean coast.

Cars Through Mont Cenis Tunnel

An agreement on conveyance of motorcars by rail through the Mont Cenis tunnel has been concluded between the Italian State and French National Railways, effective from October 15, in connection with the difficulty of keeping the road over the pass open during the winter.

As at present, the service is to work between Modane, the French frontier station, where also the Italian frontier formalities also are conducted, and Bardonnecchia, the first station on the Italian side, nearly twelve miles. Trains conveying motorcars will leave Modane and Bardonnecchia every two hours in the daytime.

Work is now in progress at Modane and Bardonnecchia on extending loading and unloading facilities and improving the roads to the stations. Modane Station is at an altitude of 3,467 ft. and Bardonnecchia of 4,126 ft.

Agency Fees for Railway Tickets

Concern has been felt by travel agencies and tourist organisations in Italy at reports of plans which the Italian State Railways are said to be considering of reinstating the agency surcharge on the official fares in respect of railway tickets sold by travel agencies. This charge was abolished in 1951. The surcharge was never popular and was one of the reasons for congestion of station booking offices.

SWITZERLAND

Rhaetian Railway in 1952

Despite the favourable tourist season in the Grisons enjoyed in 1952, the number of passengers carried by the Rhaetian Railway that year was 5,588,294, against 5,673,350 in 1951. The decline was due entirely to the smaller number of third class, while the number of second class passengers rose to 227,955 from 223,723 in 1951.

Goods traffic also contracted, the total dropping to 388,580 tonnes, against 425,146 tonnes in 1951, contrasting with a rise of 26 per cent. between 1950 and 1951. The contraction is attributed to the general regress in goods traffic over Swiss railways in 1952, and to lower imports and intensified road competition.

FRANCE

Abolishing Level Crossings at Bordeaux

Of the level crossings which exist on the outskirts of Bordeaux, two north of Bordeaux St. Jean on the main Paris-Bordeaux highway, caused particular inconvenience for years. The Cenon crossing was situated on the Paris-Bordeaux main line and the Bastide crossing on the branch linking Bordeaux St. Jean and Bordeaux Deschamps.

It was first thought that it might be possible to replace them by overbridges

or underbridges, but this proved impracticable because of the long approach slopes required. On the advice of the local authorities the ministry agreed to the diversion of the railway. A connecting line is therefore to be constructed from the Ducos Viaduct at the end of the Lormont tunnels on the Paris-Bordeaux line to join the former Etat line into Bordeaux before it crosses the Paris-Bordeaux highway by means of the Pont Rouge underbridge. The link between the St. Jean and Deschamps lines will be moved farther north to avoid a crossing the highway and this line will also cross the highway by means of Pont Rouge, which is being strengthened to carry the additional traffic.

New Four-Year Plan

The S.N.C.F. has prepared a second four-year plan to be carried out in 1954 to 1957 which awaits government approval. It contemplates an overall expenditure of fr. 187,000 million. A total of fr. 57,000 million represents further reparation payments. Modernisation properly so-called accounts for fr. 115,000 million and electrification calls for fr. 60,000 million to complete present schemes and to begin new projects, including the line from Lyons to Marseilles. Expenditure will be financed to the amount of fr. 114,795 million by public loans and by the modernisation funds. S.N.C.F. finances will provide fr. 24,695 million and the remaining fr. 48,000 million will be covered by State reparation payments.

Monsieur Louis Armand, Director General of the S.N.C.F., in an interview to *Le Monde*, said that the S.N.C.F. made the profit on its operations a basic consideration. Thus the first stage in the electrification of the Lyons-Marseilles line—to Tarascon with an extension to Nîmes—would save 285,000 tons of coal a year. The connection with the electrified South-Western system would considerably improve rolling stock user.

The second stage in the North Eastern Region, following the electrification of the Valenciennes-Thionville line, would save another 180,000 tons of coal. The third stage, planned for 1956, was expected to bring a further economy of 400,000 tons. The plan also provides for saving of 32,000 tons on the La Roche-Saint-Gervais and Culoz-Geneva lines, indispensable adjuncts to the Paris-Lyons electrification. In all, the projects would mean that 897,000 tons of good quality coal would be available every year for other national purposes.

WESTERN GERMANY

Renewing Track near Hamburg

When in 1952 the permanent way of a 7½-mile section of the Hamburg-Kiel line between Eidelstedt and Tornesch became due for renewal, it was decided to try out highly mechanised methods. The section carries 230 trains in 24 hr. The work required careful planning, as interference with traffic on weekdays had to be as little as possible.

The line was divided into ten sec-

tions. The four longest sections were tackled mainly in four successive week-end possessions, which included six hours (10 a.m. to 4 p.m.) preparatory work on Friday, nearly 32 hr. from Saturday night to Monday morning for the main work, and another six hours thereafter for finishing work. The six other sections were tackled during the week. During the possessions, single-line working was in operation, for which purpose sixteen temporary cross-overs designed for a speed of 37 m.p.h. were needed at different times.

The plant included two Matisa ballast clearing machines, two Matisa tamping machines, three sets of five hand-operated gantry cranes for handling the lengths of track, one 10-ton Demag crane, one 15-ton steam-operated crane, one scraper, one roller, four Vibromax machines and one silo wagon. Four special trains for permanent way materials, five special trains for signalling and mechanical engineering works, and one for telecommunication works were in use.

JUGOSLAVIA

Vienna-Trieste Express Railcar Service

Agreement in principle has been reached on a fast railcar service between Vienna and Trieste over the main line of the former Südbahn of the Austro-Hungarian Empire. From Vienna to Trieste is some 350 miles, of which 176 now are in Yugoslav territory and 18 miles in the Free Territory of Trieste. The throughout time by railcar would be 9½ hr., against the present fastest timing of some 17½ hr.

IRELAND

Transport in Donegal

The future of public transport in Donegal is under consideration by the Minister for Industry & Commerce. The problem is complicated by features which do not apply in other parts of the country. Decisions are not to be taken until local interests have been given an opportunity of expressing views.

Lough Swilly Services Discontinued

The Londonderry & Lough Swilly Railway has announced the discontinuance of rail services between Londonderry and Buncrana and Londonderry and Letterkenny via Tooban Junction. Road lorry services are being substituted centred on Londonderry, Bridge End, Buncrana, Newtown-cunningham and Letterkenny, all formerly served by the railway.

It is proposed, for an experimental period, to continue the existing through bookings with stations on other railways and the rail stations specified above, with the proviso that cross-town cartage charges at Londonderry will accrue to the Lough Swilly Company in view of the fact that under the new system the company's road transport services in future will collect or deliver at the other railway stations or steamship companies' dockside warehouses.

Modernised Loudspeaker System at Glasgow Central

Quality maintained in emergency operation, and switch-selected adaptation to male or female voices

THE public address system at Glasgow Central Station, Scottish Region, has recently been modernised throughout by the General Electric Co. Ltd. This work has involved installation of a new twin-bay amplifier rack assembly, a new announcer's control unit and microphone, and new loudspeakers of a special design in the circulating area, main booking hall and the Argyle Street and Hope Street booking halls. The new equipment is also capable of operating all existing diffuser loudspeakers installed on the 13 main platforms. Provision has been made for the connection of a gramophone pick-up for music.

Concentric diffuser loudspeakers, developed by Goodmans Industries Limited, have been used in a revised pattern suitable for railway station work, the revision being the result of collaboration between the Research Section of Goodman Industries Limited and the Research Laboratories of the G.E.C. Each loudspeaker incorporates a 10-in. permanent magnet unit. The case of the loudspeaker consists mainly of two aluminium spinnings which have been chemically treated to give an inert etched surface, before being given their coats of protective paint. The choice of the surface adopted and of the acid- and alkali-resisting paint employed was made after tests had been carried out by the Chemistry Division of the Railway Executive Research Department.

Each loudspeaker is fitted with a tapped transformer for individual volume adjustment, which is accessible without having to dismantle the complete unit.

Amplifier Rack Assembly

Total power required to operate all the station loudspeakers simultaneously is 240 W., obtained from four identical 60-W. amplifier units. The two amplifiers in the left-hand rack are arranged to supply the Concentric diffuser speakers in the circulating area and booking halls, while the two amplifiers in the right-hand rack supply the platform diffuser circuits. Should one amplifier of either pair fail, the two loudspeaker loads are paralleled and connected to the remaining amplifier, but are rematched in such a way that this amplifier still works into its correct load. Although there is then a slight overall reduction in the power available, the freedom from distortion ensures the necessary intelligibility for a satisfactory emergency service.

The standby system is brought into operation by changeover switches on switching panels below each pair of amplifiers. Operation of a switch results in a dummy load resistance of the correct value being automatically con-



One of the concourse loudspeakers

nected across the output of the faulty amplifier ready for the maintenance engineer's test procedure.

Adjustments and Maintenance

An independent microphone pre-amplifier with a standby unit is provided, which feeds the four power amplifiers over a 600-ohm line. Changeover switches are fitted which select pre-set tone-control circuits to suit the voices of either male or female announcers.



Construction of Concentric diffuser type loudspeaker for station use

The two output level meters, one on the announcer's control cabinet and the other on the rack assembly, are not connected electrically. The announcer's output level meter is fed from a separate amplifier unit taking its signal from the 600-ohm line connecting the pre-amplifier to the main power amplifiers. The output level meter on the rack on the other hand, in conjunction with its associated monitor loudspeaker unit, takes its power via a rotary selector switch from the outputs of any of the four power amplifiers, and thus affords the maintenance engineer a quick and accurate means of comparing the outputs of the four amplifiers.

All loudspeaker circuits are relay-selected by the operation of the 12 keys on the announcer's control unit, and all output switching and input switching relays are mounted so that the armature and contact spring assemblies project through cut-outs in the fronts of the main control and output switching panels.

VHF Radio to Aid Installation

Portable V.H.F. radio telephone units were used during installation of the new sound equipment to ensure that every unit in the system was set at its optimum position. They were also used by the installation engineers when adjusting the volume levels on individual loudspeakers, to ask their colleague in the announcer's room for the next test announcement.

MOVEMENT OF GYPSUM FOR LAND AFFECTED BY SEA FLOODING.—The Ministry of Agriculture & Fisheries has organised the supply of waste and ground gypsum to help to re-establish the fertility of agricultural land affected by flooding on the night of January 31/February 1. The Railway Executive and the Road Haulage Executive have undertaken jointly the movement of some 80,000 tons from various supply centres, of which some 12,000 tons have been moved direct by British Road Services, to cover the farms involved. Waste gypsum is being conveyed from Haverton Hill in block train loads of 36-40 wagons each, approximately 400 tons, to various stations in Norfolk, Suffolk and Essex. The Road Haulage Executive unloads the gypsum and delivers to the farms from a pre-arranged delivery order list supplied by the Ministry. At present, two trains a week are passing from this point to the Eastern Region but arrangements have been made to increase the flow of this traffic, and from August 5 it is hoped that waste gypsum will come forward at a rate of one train a day. Ground gypsum is being received mainly from various factories in the North East and East Midlands areas consigned to stations in the whole of the flood area. This traffic at present averages 3,000 tons a week.

Electrification Through the Pennines—2*

Steps towards all-electric working on the Eastern Region Manchester-Sheffield-Wath lines

THE competence of the motormen employed on the Manchester-Sheffield-Wath electrification of the Eastern Region combines with the efforts of the Operating Department in ensuring that efficient and economic use is made of the electrical equipment. The effectiveness of the training scheme described in our January 23 issue was demonstrated in the course of journeys we were able to make recently on electric locomotives between Wath and Dunford Bridge through the courtesy of Mr. H. C. Johnson, Divisional Operating Superintendent (Western), Eastern Region. On the westbound journey the train locomotive was Bo+Bo No. 26031, with No. 26015 as banker. The load was 38 (=43) wagons, or 750 tons.

Speed between Wath and Barnsley Junction is restricted to 20 m.p.h. and at this speed in series full field the motor current reading in No. 26031 was 250 A. After Aldam Junction, where the Worsborough Branch is joined, the climb to Wentworth Junction at the foot of the 1 in 40 section was made in series full field at a minimum of 15 m.p.h. without the current going above 500 A. The motorman then notched up to his fourth weak-field

notch in order to gain speed for the climb, current at this stage being 550-600 A.

Maximum current noted on the bank was 650 A. at 14 m.p.h. in weak-field 2; and minimum speed 12 m.p.h. by which time the motorman had notched back to weak-field 1, with a current of about 550 A. When first put into traffic the locomotives were wired so that the weak-field notches were available only in parallel, but they have since been modified for series weak-field running as well in order to give the best performance on the bank.

After Oxspring Junction, by which time the gradient has eased, the motorman was running in series full-field and accelerating to 18 m.p.h. with currents of 400-350 A, and on joining the main line was able to get into parallel. Notching up to weak-field 3, speed was 30 m.p.h. at Thurlestone and current approached 700 A. Subsequently the same speed was maintained in parallel full-field with currents ranging about 400 A. Dunford was reached in about the level hour from Wath.

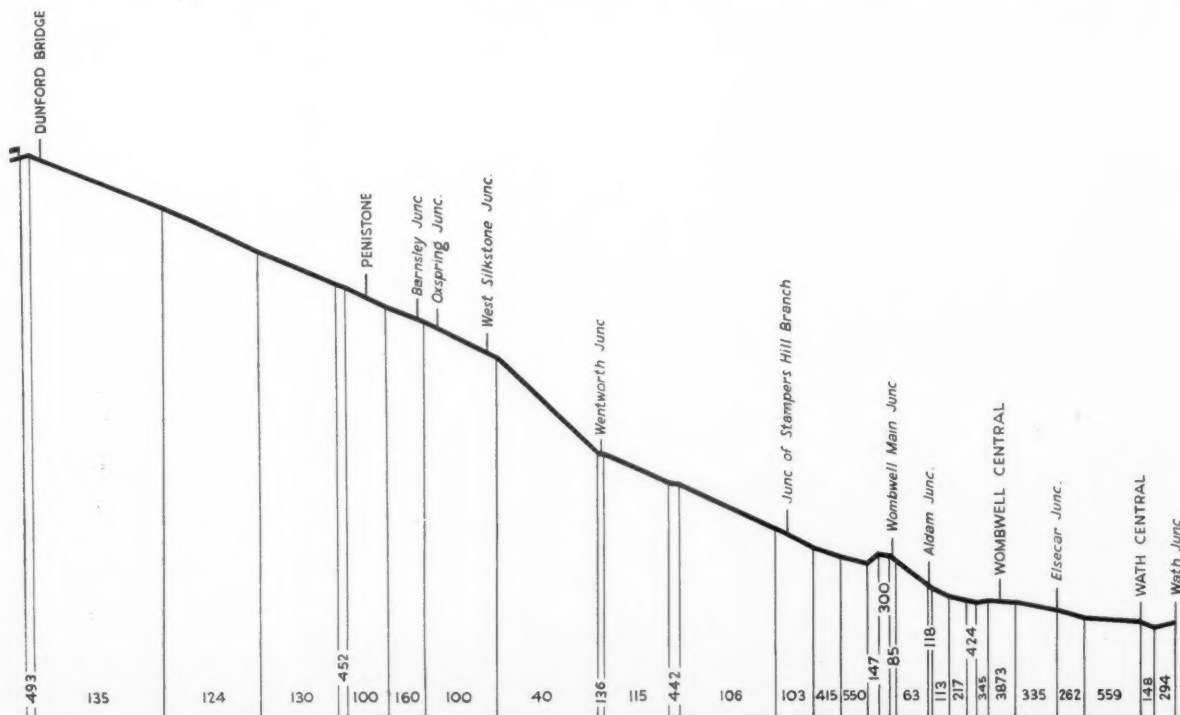
On the return trip No. 26031 left Dunford Bridge with a load of 52 empties. At Hazelhead the speed was adjusted to 30 m.p.h. and the series regenerative connections were set up. This speed was held steadily without

further adjustment of excitation until slowing for Penistone and running into the yard at Barnsley Junction. Here No. 26015 came on the front to assist with braking. Both locomotives began regenerating at West Silkstone. Riding in the cab of No. 26015, it was noticed that 20 m.p.h. was held down the 1 in 40 with the series connection and maximum excitation, the regenerated current reaching about 250 A. The train locomotive went out of regeneration at Wentworth Junction, after which speed of the train was controlled from the cab of No. 26015.

Regenerative Braking

The confidence of the motormen in the regenerative system was typified by the remark of one of them, after controlling the train to 30 m.p.h. on the main line, that "he could go at that speed to London without touching the handles again." On this section and on the Worsborough Branch it was, indeed, impressive to notice the consistency of the speedometer reading and instructive to observe the movements of the ammeter above and below zero as changes in gradient caused the motors to draw current to maintain the speed, or to regenerate into the line. Very little manipulation of the exciter control was necessary at any time. During

* Part 1 appeared in our July 31 issue



Gradient profile of Wath—Dunford Bridge section

normal motoring throughout the two journeys, the proficiency of the motormen was evident in the steadiness of the ammeter reading while notching up.

Progress of Later Stages

The clean bore of the new Woodhead Tunnel is due to be handed over this month, and prefabricated track for laying in this section is now being assembled in part of Dunford Yard. A new signal box has been built at Dunford Bridge and new station platforms, south of the present ones, will be provided on the revised alignment approaching the new tunnel. An altered alignment at the western entrance will eliminate the reverse curvature at this point. At the western end of the scheme the final overhead structure on the main line was erected, in Manchester London Road Station, on the weekend of May 16-17. Power supplies are available, and training of motormen is in progress on the Glossop branch and in the sidings at Mottram. A further stage of training will be heading steam trains up to Crowden with electric locomotives.

It is hoped to introduce electric working for all traffic between Manchester and Penistone in June next year. In October, 1954, passenger working with electric traction is scheduled to be extended to and from Sheffield Victoria as an interim step.

In the final stage electrification will reach Rotherwood Sidings, which will then become the changeover point for goods traffic to and from the South and East. Rotherwood has five up and four down exchange sidings.

At the Manchester end the branch to Ashton Moss, where between four and five hundred wagons a day are exchanged with the London Midland Region, has been electrified; also part of the Stalybridge branch. The line from Fairfield to Manchester Central is electrified as far as Reddish, where a depot for the maintenance of electric locomotives and for the stabling and maintenance of multiple-unit stock is under construction. Passenger trains to and from Manchester Central will change locomotives at Guide Bridge, and freight trains to and from West Lancashire at Hyde Road. Exchange sidings are available at Godley Junction for traffic to and from the former C.L.C. line.

Marshalling of wagons for Manchester area destinations and beyond will continue to be carried out in the gravity yard at Mottram, which sorts some 2,500 wagons a day. The yard is equipped for two-way loudspeaker communication between shunters and signal box, and has push-button operation of points. All trains out of the yard will be hauled by electric locomotives even if they are to be handed over to steam working at one of the nearby exchange points such as Godley, or Hyde Road.

Multiple-unit suburban trains will serve Manchester London Road, Glossop Central, and Hadfield for Hollingworth. The stock for these ser-



Train approaching Dunford Bridge, the present changeover point between electric and steam working

vices has been delivered by the Metropolitan-Cammell Carriage & Wagon Co. Ltd. and at the time of writing the G.E.C. electrical equipment is in course of installation. The first of the Co-Co express passenger locomotives for later stages of the scheme is also nearing completion, the installation of electrical equipment being now in progress. Mechanical parts were built by the railway and the electrical equipment by the Metropolitan-Vickers Electrical Co. Ltd. Passenger duties, express as well as slow, will also be shared by the Bo+Bo locomotives, but in winter only those of the Bo+Bo class that have train heating boilers will be available for such work. In the Co-Co series various developments in the suspension of the axle-hung motors have been incorporated in order to minimise lateral and other forces that may be detrimental to the track at speed.

All the Bo+Bo locomotives have been modified so that if the motorman notches back in series, the resistance banks are connected in two parallel groups and the current is shared be-

tween them. This change reduces heating of the resistances when notching back in series connection is necessary to check slipping or for traffic reasons. Alterations to the air ducting have overcome difficulties experienced at first from dust and slurry, stirred up by the exhaust cooling air of the motors, being drawn in through the filters and choking the circulation system. Changes have also been made in the light of experience in the grades of brushes used for the traction motors and auxiliaries.

The electric locomotives are operated normally with both pantographs raised as this has been found to reduce arcing from the overhead line at knuckles and overlaps. With regard to regenerative braking, the system of electronic switching of regenerated power on to resistances if the line voltage builds up beyond a certain limit has been found completely reliable and satisfactory.

A staff of 16 men trained for overhead line inspection duties (which includes training for climbing structures) is based on Penistone, the electrical control centre for the whole



Bo+Bo train and banking locomotives leaving Wath shed for the run to Dunford Bridge described in this article

scheme. A description of the supervisory apparatus and associated equipment installed here was given in our February 8, 1952, issue.

In concluding with these technical notes, the fact that operating efficiency will be the final test has not been forgotten. The whole scheme is based on

out-and-home working of crews between Sheffield or Wath and Manchester and back. The increased capacity of the new Woodhead Tunnel under electrification will be one of the items contributing to a more regular traffic movement and better use of manpower in the complete scheme, but

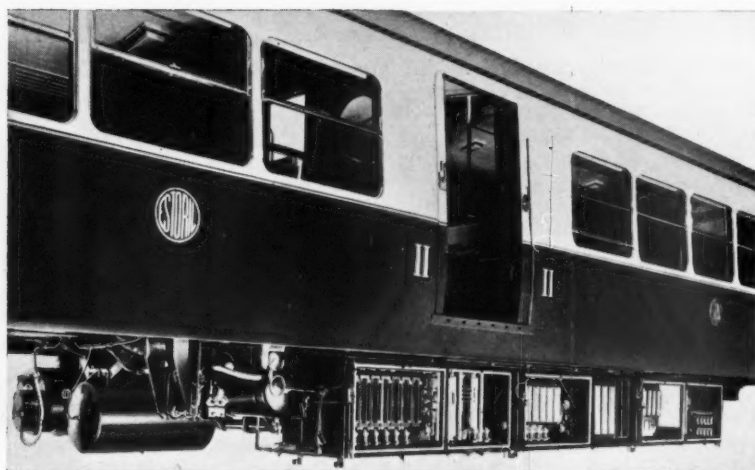
the question inevitably arises whether for maximum benefit from electric working over the Pennines it is not necessary to look ahead to electric traction on the lines running west and north-west from the Manchester concentration.

(Concluded)

Electric Traction Systems, Present and Future—2*

Conclusions deduced from a review of the electrified systems of the world

By J. C. Grant, M.Sc., A.M.I.E.E., A.M.N.Z.I.E.



Control equipment (G.E.C.) mounted under the floor of a 1,500V. d.c. motor coach for the Estoril Railway, Portugal. At present it seems unlikely that a similarly compact arrangement could be achieved in a motor coach fed from a single-phase, 50-cycle contact wire

IN the previous part of this article the various electric traction systems were discussed and attention was drawn to the effect of a progressive transfer of equipment from the fixed installations to the tractive units. We will now attempt to examine whether the railway operating conditions can give any guidance to the system to be chosen for a given application. The electrified systems of the world have accordingly been listed in Tables 2 and 3 in ascending order of voltage. The principal suburban systems are shown in Table 2, and the principal main-line systems in Table 3. The electrified route- and track-miles for each system are given in two adjacent columns, and a further column lists the ratio between these two, which is the average number of tracks over the whole of each route.

Actual figures of traffic passing over the various systems are difficult to obtain in a comparative form, owing to the diversity of methods employed for assembling the data and variability from year to year. The ratio of track-to-route-miles, however, is almost a fixed quantity and can be taken to represent

the maximum number of trains per hour which can be run in both directions over any given route, conditional to a certain extent on the type of signalling employed. It will be shown later how this conception of number of trains on a given route is more important than the normally accepted figure of traffic density in ton-miles per route-mile in determining the system of electrification to be adopted. However, let us first see whether any broad relationship exists between the average number of tracks available and the system of electrification actually chosen.

Comparing Tables 2 and 3 as a whole, two striking features will be noted:—

(a) Suburban electrified systems, that is, those based on a large city and its suburbs, employ a d.c. contact system with a voltage not usually greater than 1,500, whereas main-line systems (with one notable exception in the U.S.A.) employ a d.c. contact system at 1,500 V. or 3,000 V., or an a.c. contact system at 11 kV. or above. The major a.c. systems, except the Kando system in Hungary, are of the low-frequency type.

(b) The great majority of suburban

electrified systems, especially those of appreciable mileage, have an average number of tracks of 2·3 or more; the main-line systems, apart from a few exceptions, have an average number of tracks of 2·1 or less.

If we relate these two features together, we find that, broadly speaking, suburban systems employ a contact system voltage up to 1,500 volts, and have more than an average of 2·2 tracks.

An average of 2·2 tracks has, indeed, a peculiar significance. It represents the borderline between a railway which has double track or more throughout, and a railway with some single-track sections, allowing approximately 10 per

TABLE 2
Principal Suburban Systems

System D.C.I	Voltage	Route-miles	Track-miles	Av. No. of tracks
Great Britain				
Southern Region	660 V. d.c.	715	1,782	2·5
Tyneside	660 V. d.c.	43	106	2·5
Liverpool-Southport	630 V. d.c.	37	93	2·5
London, 4th rail	630 V. d.c.	241	653	2·7
France				
Paris Métro	650 V. d.c.	54	112	2·1
U.S.A.				
Long Island	650 V. d.c.	141	449	3·2
New York	650 V. d.c.	70	441	6·3
Germany				
Berlin	800 V. d.c.	181	430	2·4
Austria				
Vienna	800 V. d.c.	17	37	2·2
Argentina				
Buenos Aires	800 V. d.c.	70	202	2·9
Hungary				
Budapest	1,000 V. d.c.	91	178	2·0
U.S.S.R.				
Baku	1,200 V. d.c.	19	32	1·7
Moscow	1,500 V. d.c.	112	275	2·5
Leningrad	1,500 V. d.c.	44	105	2·4
Indonesia				
Batavia	1,500 V. d.c.	50	145	2·9
Australia				
Sydney	1,500 V. d.c.	110	316	2·9
Melbourne	1,500 V. d.c.	173	439	2·5
New Zealand				
Wellington and Hutt	1,500 V. d.c.	53	126	2·4
South Africa				
Cape Town*	1,500 V. d.c.	49	102	2·1
Denmark				
Copenhagen	1,500 V. d.c.	33	75	2·3
Netherlands				
State	1,500 V. d.c.	798	1,881	2·4
Sweden				
Stockholm	1,500 V. d.c.	53	80	1·5
Japan				
Tokyo	1,500 V. d.c.	509	929	1·8
Osaka	1,500 V. d.c.	129	240	1·9
Canada				
Montreal	2,400 V. d.c.	31	87	2·8
Belgium				
Brussels-Linkebeek	3,000 V. d.c.	104	282	2·7
Poland				
Warsaw	3,000 V. d.c.	65	158	2·4

* Under conversion to 3,000 V. d.c.

* Part 1 appeared in our July 10 issue

cent increase in track-mileage, due to terminals, junctions, and sidings. As is well known to the operating staff, the presence of single track involving two-way working on any section of the

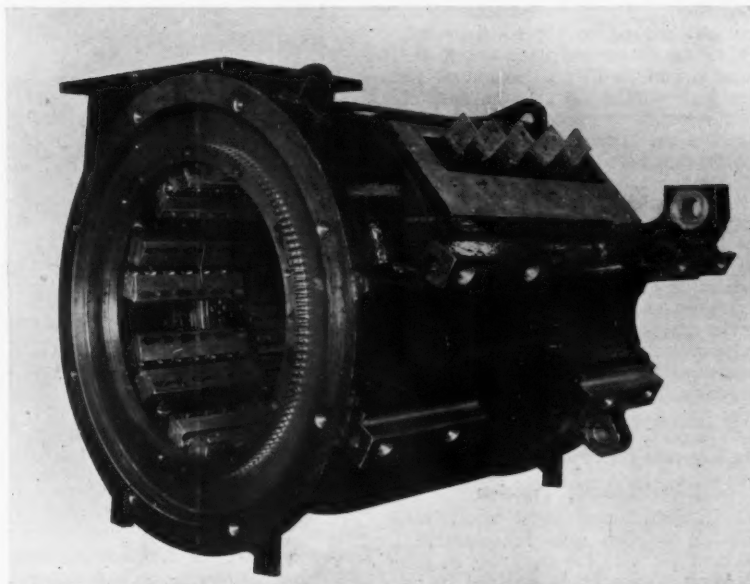
TABLE 3
Principal Main-Line Systems

Country and system	Voltage	Route-miles	Track-miles	Av. No. of tracks
U.S.A.—Illinois Town	650 V. d.c.	431	488	1.1
Cuba D.C.I	1,200 V. d.c.	54	110	2.0
France D.C.I	1,500 V. d.c.	2,355	4,507	1.9
Spain D.C.I	1,500 V. d.c.	518	971	1.9
India D.C.I	1,500 V. d.c.	236	566	2.4
U.S.A. D.C.I	3,000 V. d.c.	744	1,113	1.5
U.S.S.R. D.C.I	3,000 V. d.c.	828	1,100	1.3
Algeria D.C.I	3,000 V. d.c.	167	211	1.3
Brazil D.C.I	3,000 V. d.c.	569	862	1.5
Chile D.C.I	3,000 V. d.c.	165	269	1.6
Mexico D.C.I	3,000 V. d.c.	64	91	1.3
Morocco D.C.I	3,000 V. d.c.	471	602	1.3
South Africa D.C.I	3,000 V. d.c.	633	1,275	2.0
Italy D.C.I	3,000 V. d.c.	2,338	4,731	2.0
A.C.5* 3ph. 16½c.		936	1,713	1.8
U.S.A. A.C.I. and D.C.2	11 kV. 25 c.	1,210	3,619	3.0
Switzerland (Rhaetian, etc.) A.C.I	11 kV. 16½ c.	330	391	1.2
(State) A.C.I	15 kV. 16½ c.	2,166	4,064	1.9
Sweden A.C.I	16 kV. 16½ c.	3,706	3,626	1.5
Austria A.C.I	15 kV. 16½ c.	680	1,487	2.2
Germany A.C.I	15 kV. 16½ c.	1,555	4,252	2.7
Norway A.C.I	15 kV. 16½ c.	633	842	1.3
Costa Rica A.C.I	15 kV. 20 c.	86	100	1.2
Hungary A.C.2†	15 kV. 50 c.	117	404	3.5
France (Annecy) D.C.2 and A.C.4	20 kV. 50 c.	48	48	1.0
Germany (Hollental) D.C.2 and A.C.4	20 kV. 50 c.	35	57	1.6

* Being replaced by 3,000 V. d.c.

† Kando system

route considerably restricts the frequency of the service which it is possible to operate. A suburban system is characterised by the high frequency of



Low-frequency a.c. traction motor with end cover removed to show brushgear and part of slotted field winding

its service, so that if it has any single track sections at all, they will undoubtedly be found only at the extremities of a few outlying spurs. On many main lines, however, single-track sections can often be tolerated, especially where heavy trains can be run at long intervals.

A high proportion of the suburban systems listed has an average of 2.5 tracks or more, suggesting three or more tracks on some parts of the route. They employ the most advanced signalling systems, designed to produce the maxi-

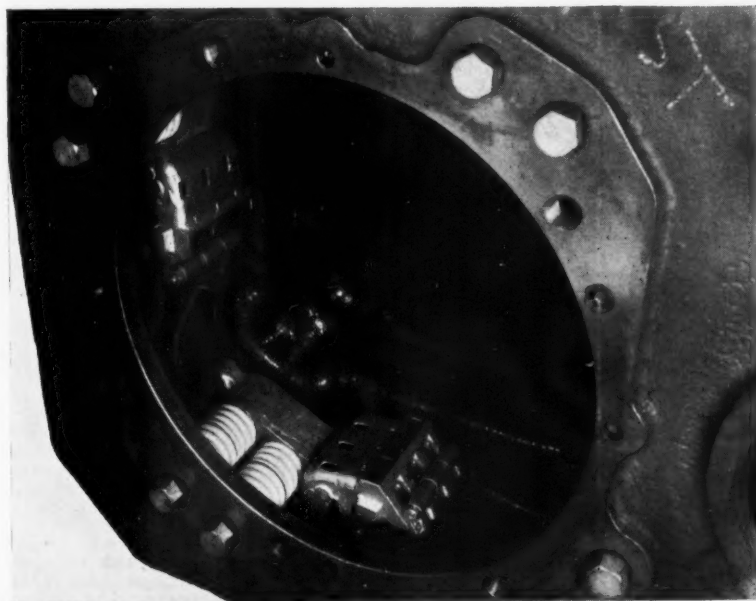
mum frequency of service on the tracks available, as, for example, on the London Transport system. It is well known that such conditions are most favourable to low-voltage d.c. electrification.

One of the most prominent of the main-line systems is the low-frequency a.c. electrification in Sweden, which has no more than an average of 1.5 tracks over its 3,706 miles of route. Despite the comparatively light traffic over much of the system, economic electrification has here been proved in a choice of as much as 16 kV. for the voltage on the contact wire.

Another prominent main-line system which has been extensively electrified is to be found in Italy. The standard contact wire voltage is now 3,000 V. d.c., and the remaining sections of route operating on the obsolete 3-phase a.c. system are in course of being converted to the standard. It is to be noted that the average number of tracks in the Italian system is rather greater than on the Swedish system, and the frequency of the traffic is correspondingly larger.

Voltage and Number of Tracks

The foregoing consideration of the electrified systems of the world strongly suggests a direct relationship between the contact line voltage and the traffic occupancy of the route, as represented by the average number of tracks. The economic reason for this interdependence is probably to be found in the efficient use of capital equipment. With a low system voltage, the fixed capital installations form a large proportion of the total. Substations are close together and the overhead system tends to be heavy, whereas the tractive units are simple in design. As the voltage increases, and converting substations are dispensed with, more and



English Electric traction motor, showing the simple arrangement of field coils and brushgear characteristic of a d.c. machine

more equipment has to be transferred from the ground to the tractive unit, until ultimately the overhead system becomes virtually a light extension of the State high-voltage transmission system, and the locomotive becomes in effect a travelling substation.

With expensive ground installations, such as are found with a low-voltage railway electrification, the occupancy of the route requires to be high in order that the use of the fixed installations may be as continuous as possible. In electrical engineering terminology, the substation load factor should be high. On the other hand, with a high-voltage electrification, particularly at normal frequency, heavy trains can be run efficiently at wide intervals since the larger proportion of the capital charge, which is now vested in the locomotive, is in any case continuously employed.

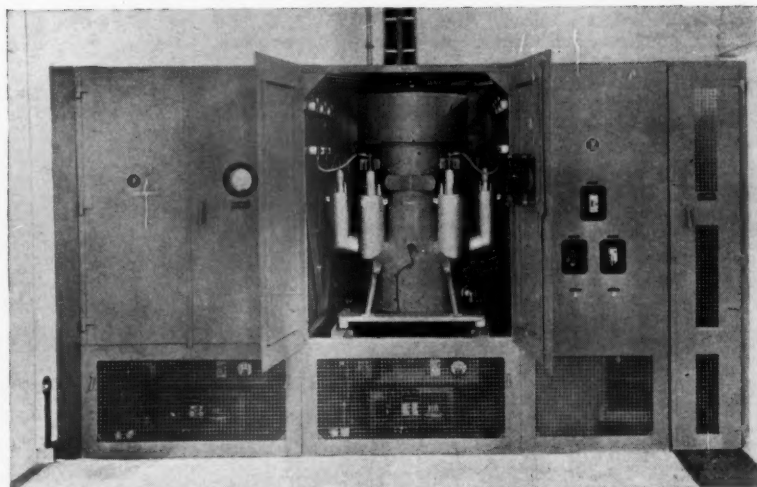
Diesel-Electric Traction

Diesel-electric and other equivalent forms of traction now fall naturally into their place as the argument in the preceding paragraph is pursued to its ultimate conclusion. The locomotives are now not only travelling substations, but also travelling power stations, and embody the whole of the capital expenditure on electrification. They, therefore, show an economic advantage over electrification systems employing a contact line distribution on a route where the traffic is only sporadic.

Diesel-electric traction can thus be regarded as the precursor of full electrification. By operating on outlying routes as electrification proceeds, it should be able to attract traffic by reason of its more favourable schedules, and pave the way for an extension of the contact line electrification at a later date. In America, owing to the availability of diesel fuel oil and the adoption of mass-production techniques in locomotive construction, diesel-electricity has invaded the province of full electrification, so that development of the latter has become atrophied.

Present Trends and Conclusions

Where a railway is predominantly suburban in character, it may be concluded that the d.c. contact wire system of electrification, now so universally



English Electric sealed tank rectifier at Hulshorst Substation, Netherlands Railways. Converting substations would be eliminated by using normal-frequency a.c. in the contact wire, but some form of conversion on locomotives or rolling stock would then probably be necessary

employed, is not likely to be ousted by the high-voltage a.c. contact system. Apart from the inherent simplicity and low cost of the d.c. tractive units suitable for the intense traffic, a suburban area is usually well built-up, so that clearances for a high-voltage contact system would become a major problem. A contact voltage not greater than 1,500 is adequate for a suburban electrification where there is a high frequency of traffic.

No such definite conclusion can be made in the case of main-line operation, and it is in this sphere that development work in progress in France, America and latterly in this country, is likely to have the greatest influence. This will be especially true of those systems where single track with two-way working obtains over a large proportion of the route; that is, those systems which would be definitely uneconomic even at 3,000 V. d.c.

If a really satisfactory 50-cycle a.c. series traction motor were to be developed, then it would undoubtedly become universal on main-line electrification projects. This at present

seems exceedingly unlikely owing to an inherent physical defect in this type of motor.

The main-line application thus appears likely to divide itself between 3,000 V. d.c. where the average number of tracks is greater than 2.0; high-voltage a.c. with conversion on or off the locomotive where there is an average number of tracks between about 1.6 and 2.2; and finally, diesel electrification where the route is mostly laid as single track with little duplication.

The most promising development with a high voltage 50 cycles per sec. contact wire at the moment seems to be the rectifier locomotive, although other converter types must not yet be ruled out. Thus, the mercury-arc rectifier, which is already fast taking command of a.c. to d.c. conversion in the static substations on the majority of suburban and other d.c. contact line electrification schemes, is also well placed for a newly-developing application aboard the locomotives of the main-line railway electrification projects of the future.

(Concluded)

NEW "RED ARROW" RAILCARS IN SWITZERLAND.—The first "Red Arrow" high-speed electric railcars of the Swiss Federal Railways date from the years 1935 to 1938. Seven, of the "RCe 2/4" series, are four-wheel bogie vehicles with two motored axles and an hourly rating of 556 h.p. Two three-unit articulated lightweight sets, "RBCFe 8/12," with an hourly rating of 2,280 h.p., were introduced in 1937-38. Each unit had two four-wheel bogies, the end bogies having two motored axles and the intermediate bogies one motored axle each. One of these was later converted into a double-unit railcar ("RBCFe 4/8") with four four-wheel bogies and four motored axles. In 1939, a further similar two-

unit railcar set, "RBe 4/8," was introduced specially for excursion traffic. All the "Red Arrows" have been used mainly for excursions, and as a result of increasing demand for them it was decided in 1951 to increase the fleet by two further sets, one to be built by the Ateliers Sécheron, of Geneva, and the other by Brown, Boveri & Co. Ltd., of Baden. The mechanical portions of both have been built by the Schlieren Wagon & Lift Works, of Schlieren (Zurich). The Brown, Boveri set was placed in service early in July, and the other is due later this month. Both are twin-units with two four-wheel bogies in each unit. The four motored axles are each powered by a traction motor with a 1-hr. rating of

350 h.p. Maximum speed is 77½ m.p.h. Gradients of up to 1 in 20 can be negotiated without a pilot locomotive or railcar. On steeper gradients piloting is necessary. The new railcars have standard drawgear so that they can be coupled to any train or used to haul standard vehicles. The set provides seating accommodation for 123 passengers. At each end there is a large compartment with 20 revolving double-seats with adjustable backs, seats and backs being upholstered. At the inner ends of both units there are two lounges, each with 18 easy chairs. Other accommodation includes a buffet, an apparatus compartment for the loudspeaker installation, and two cubicles for electrical equipment.

Gauge Conversion in South Australia

*Broad gauge services reach
Mount Gambier in the south east*



New platform at Naracoorte: 3 ft. 6 in. gauge on left, 5 ft. 3 in. on right

A CEREMONY marking the completion of the major part of the conversion of 114 miles of 3 ft. 6 in. gauge track from Wolseley, on the main Adelaide-Melbourne line to Mount Gambier, which forms the South Eastern Division of the South Australian Railways, was performed on June 23. This Division is now unique in that it forms the longest stretch of mixed gauge track in Australia, being capable of carrying trains of both 5 ft. 3 in. and 3 ft. 6 in. gauges. The method of conversion was to relay the whole track with three rails, one rail being common to trains of both gauges.

The special train arrived at Mount Gambier headed by two diesel-electric locomotives, having travelled direct from Adelaide. It carried the Governor of South Australia, Sir Robert George, and Members of Parliament and prominent officials of the State. In the presence of some thousands of people the Governor officially declared open the line in its reconstructed form, and a public service commenced the next day.

On June 15, 1887, another special train arrived at Mount Gambier carrying the then Governor of South Australia, Sir William Robinson, and an official party, before the opening next day of the 3 ft. 6 in. gauge line connecting Mount Gambier with the broad gauge line at Wolseley.

Initial Difficulties

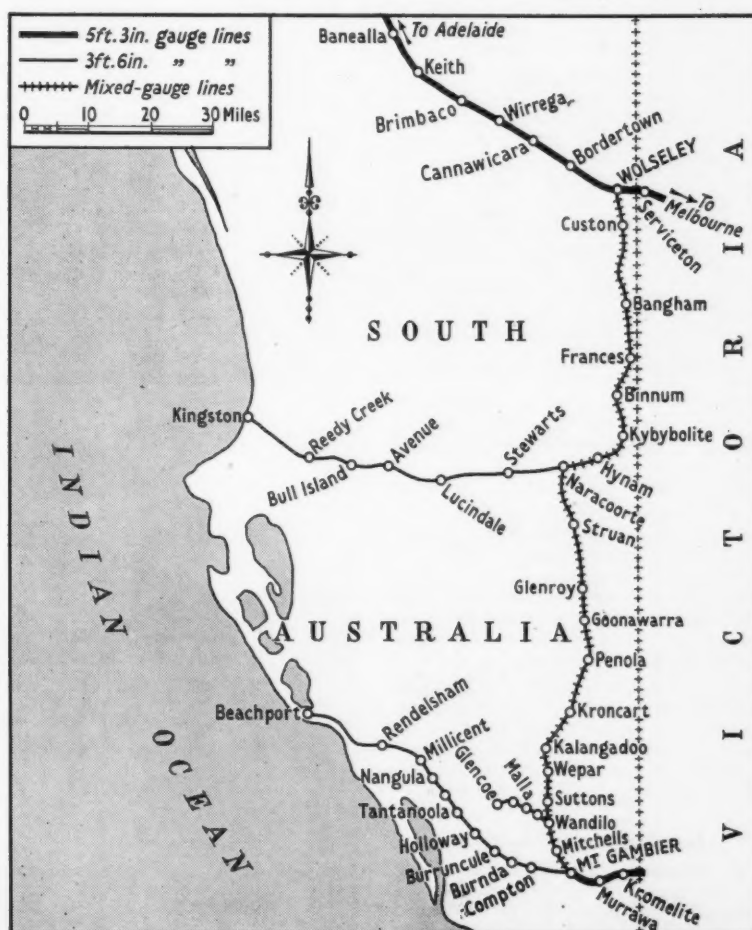
The present project was started at the conclusion of the war and many difficulties were encountered which delayed its completion until now: first, a shortage of materials, secondly scarcity of labour for such work at a time when more selective and remunerative employment was available. The number employed was 426 at the peak and 196 at the lowest ebb in April, 1952. Later, finance was a problem.

An account of the preliminary stages of the work was given in our issue of September 23, 1949; at that time

the objective was to reach Naracoorte, 49 miles south of Wolseley. What follows is a brief description of the various stages of progress.

By February, 1950, passenger trains were run between Adelaide and Naracoorte on the broad gauge line while freight was transferred at Wolseley to narrow gauge wagons, even for stations to Naracoorte until such time as yards were completed. When this was done it was possible to run broad gauge freight trains direct from Adelaide, but freight for stations south of Naracoorte was transferred at Wolseley on to narrow gauge trucks. Passengers to and from Mount Gambier travelled in 3 ft. 6 in. gauge trains between there and Naracoorte. There was a daily passenger service between Adelaide and Naracoorte and a night train three times weekly with sleeping cars.

The station yard at Naracoorte has been considerably enlarged to accommodate larger rolling stock. The old



Lines in the south-eastern part of South Australia



New broad-gauge yards at Naracoorte, showing in centre mixed-gauge turntable and broad-gauge engine shed on the left

station buildings are still used but a new passenger platform has been built as narrow gauge vehicles were ground-loaded only except at terminal stations.

An 95-ft turntable has been installed capable of turning locomotives of both gauges, a modern coal loading gantry has been erected with coal storage bin, a broad gauge running shed and new overhead tank and water standards have been provided and ash pits and broad gauge sidings. Narrow-gauge stock is still accommodated at Naracoorte for working the Kingston branch.

Meanwhile work went on south of Naracoorte. Between there and Struan one engineering feat of interest was the rebuilding of a bridge for the heavier broad gauge use. Nine spans of steel work had to be replaced with new spans between train services. A special gantry was built which straddled the track. As it lifted a span it placed it on a work train, took the new one and fitted it. This process continued as the train backed over the bridge.

As the new line stretched southward it was found expedient to discontinue the operation of narrow gauge passenger trains between Mount Gambier and Naracoorte. From July 23, 1951, road transport was substituted linking up with the broad gauge passenger train service at Naracoorte. Mails and perishable goods were also transferred to the temporary road service working under contract to the South Australian Railways. Transfer was effected by mobile crane on to semi-trailer transports for movement by road to intermediate stations to Mount Gambier.

Last Stages of Conversion

By October 24, 1952, work was so far advanced as to permit a further 44½ miles of broad gauge line to be opened to Kalangadoo. This second portion of the line was, however, only used for freight work, the broad gauge passen-

ger services still terminating at Naracoorte and freight for stations south of Kalangadoo still being transferred to narrow gauge wagons at Wolseley. Broad gauge metals were now 20 miles from Mount Gambier, the major objective. Narrow gauge rolling stock no longer required by the South Eastern Division was from time to time transferred to the isolated Port Lincoln Division away in the western portion of the State or sent 150 miles north of Adelaide to the Peterborough Division. These are both extensive 3 ft. 6 in. gauge systems.

The broadening of this line consisted not only in the laying of track but in constructing new standard high level platforms, re-designing station yards and where necessary, station buildings. As far as possible the future conversion of all Australian railways to the standard gauge has been kept in mind and

in carrying out the work arrangements have been made to facilitate this.

Earthworks for the last 20 miles of main line between Kalangadoo and Mount Gambier were completed and a third rail put down so that it might be possible to run broad gauge trains through by June 23, the day fixed for the official opening. Before this date, however, there remained much work to be done at Mount Gambier in the creation of facilities for the inauguration of the broad gauge service from Adelaide, because even though Mount Gambier was a three-rail station and received 5 ft. 3 in. gauge trains from Victoria, the yard was totally inadequate for planned future traffic. Therefore, new marshalling yards on a far more extensive scale than at Naracoorte were designed for trains of both gauges, for, although broad gauge services operate between Adelaide and Mount Gambier, the two branch lines to Beachport and Glencoe have not yet been converted. Also, freight sent direct from Adelaide for the branches will still be worked by narrow gauge trains between Wolseley and Mount Gambier over the main line.

Through Services

The new broad gauge service between Adelaide and Mount Gambier consists of a daily train both ways and a night train three times weekly. The latter has sleeping car accommodation and has been named the "Blue Lakes" express, after the volcanic lakes for which Mount Gambier is famous.

Two interesting possibilities are opened up by this gauge conversion. One is that an alternative through route is available between Adelaide and Melbourne which might at least be useful to tourist traffic. The other is that through rail access is now given to Portland in Victoria, the only practical seaport between Melbourne and Adelaide.



Photos

[Guy Bakewell]

Laying outer rail near Mount Gambier to accommodate broad-gauge trains

RAILWAY NEWS SECTION

PERSONAL

The Parliamentary Secretary to the Ministry of Transport, Mr. J. Gurney Braithwaite, M.P., has appointed Mr. P. G. Hudson to be his Private Secretary.

Lord Hurcomb, G.C.B., K.B.E., Chairman of the British Transport Commission, who is retiring on August 31, was born in 1883, and was educated at St. John's Col-

lege, Oxford. In 1905 he entered the service of the Post Office in the Surveyor's Department, and in the next year was transferred to the Office of the Secretary. He became Private Secretary to the Permanent Secretary in 1910, and Private Secretary to the Postmaster-General in 1911. He was later Deputy-Director, and subsequently Director, Commercial Services, Ministry of Shipping. He joined the Ministry of Transport on its formation in 1919 as Assistant Secretary in the Finance, Rates & Statistical Department, and he was Secretary of the Ministry from 1927 to 1937. In May, 1937, he was appointed an Electricity Commissioner, and he became Chairman of the Electricity Commission at the end of that year. On the formation of the second Ministry of Shipping in October, 1939, Lord Hurcomb was made Director-General and, from the amalgamation of that Ministry and the Ministry of Transport in 1941, served as Director-General of the Ministry of War Transport; from 1946, until his appointment as Chair-

man of the British Transport Commission in 1947, he was Secretary to the Ministry of Transport. He was President of the Institute of Transport for the year 1935-36. In 1950, Lord Hurcomb visited Sweden and Norway, and was received by the King of Norway. He was created a peer in 1950, and, in the same year, was decorated with the Grand Cross of the Royal Order of George I by the Greek Ambassador, for his "unfailing interest in the Greek cause

Ministry of Transport in 1919, he was transferred to London as Director of Transport (Accounting), and, in 1921, he became Accountant to the Ministry. In 1924 he returned to railway service as Assistant to the Accountant-General, L.M.S.R., and was appointed Controller of Costs & Statistics in 1927, which position he vacated in 1930 to become Vice-President, Finance & Service Department. He was created a Knight Bachelor in the Coro-

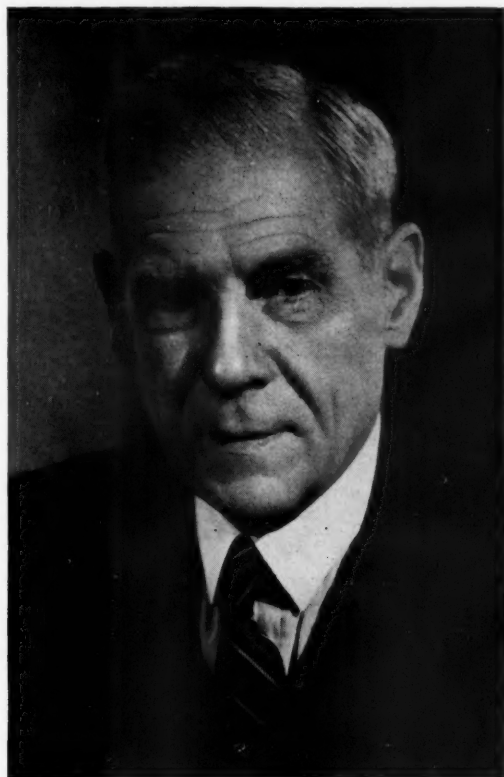


Photo.]

[Bassano

Lord Hurcomb

Chairman, British Transport Commission,
1947-53



Sir William Wood, K.B.E.

Member, British Transport Commission,
1947-53

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Mr. A. R. Sarin, Controller of Stores, Western Railway, India, was born on October 11, 1898. After completing his education at the Government College, Lahore (Punjab) he joined the Oudh & Rohilkand State Railway at Lucknow (U.P.) as a Probationary Assistant Controller of Stores on April 4, 1921. Mr. Sarin worked in various capacities in the Stores Departments of several other Indian Railways, including the East Indian, North Western, Bengal Assam and Bombay, Baroda & Central India Railways. He worked in the Indian Stores Department,

Mr. Charles F. Duggan, Vice-President in charge of operation, Illinois Central Railroad, is retiring on August 1 after more than 37 years' service.

Mr. H. H. Phillips, Chief Commercial Officer, Railway Executive, has been engaged by the Tasmanian Government to examine the State's road and rail transport systems, with particular reference to the problem of rising costs coupled with the continued growth of road, and to a lesser extent, air transport. Mr. Phillips will leave this country on August 9 and,

was recorded in our July 10 issue, and whose photograph and biography appeared in our July 24 issue, has been appointed Railway Engineering Consultant to Richard Costain Limited.

Mr. F. A. A. Menzler, C.B.E., Chief Development & Research Officer, London Transport Executive, has been appointed a member, on behalf of all nationalised industries, of the committee set up under the chairmanship of Sir Thomas Phillips in connection with economic and financial problems of provision for old age.



Mr. A. R. Sarin
Controller of Stores, Western Railway,
India



Mr. H. H. Phillips
Chief Commercial Officer, Railway Executive,
who is visiting Tasmania

Government of India, as a Purchase Officer from December, 1939, to May, 1942. After partition he was selected to work in the Ministry Railways (Railway Board) as Controller of Railway Supplies from September, 1947, to September, 1948. From September, 1948, to November 4, 1951, he worked as Controller of Stores of B.B.C.I.R., and thereafter of the newly-formed Western Railway.

The following appointments have been announced by the Illinois Central Railroad:—

Mr. E. T. Carr, General Freight Traffic Manager, Chicago, will become Assistant Vice-President, Chicago.

Mr. H. S. Powell, Freight Traffic Manager, Chicago, has been appointed General Freight Traffic Manager, Chicago. He will deal with interstate commerce works, etc.

Mr. C. A. Larsen, Freight Traffic Manager, St. Louis, becomes Assistant General Traffic Manager, Chicago.

on his arrival, the Transport Commission of Tasmania will place before him the results of its recent survey and recommendations for the future. Mr. Phillips, who entered the service of the Great Western Railway in 1908, was a member of the General Manager's personal staff until 1932, and for some years was in charge of the section dealing with rates and fares, docks, marine and general subjects. In 1946 he was appointed Assistant to the Superintendent of the Line, and, in 1950, he became Chief Commercial Officer of the Railway Executive, his present position. He was a member of the Council of the Institute of Transport, and was Chairman for 1947-48 of its South Wales & Monmouthshire Section. He is an Associate Member of the Chartered Institute of Secretaries.

Mr. N. W. Swinnerton, whose retirement as Assistant (Permanent Way Maintenance) London Midland Region, British Railways,

We regret to record the death, on August 1, of Mr. W. H. Mills, M.B.E., Assistant Secretary to the Railway Executive. The funeral will take place today, August 7, at 12.30 at Putney Vale Crematorium.

Mr. A. J. Murphy, Staff Assistant to the Civil Engineer, Kings Cross, Eastern Region, British Railways, has been appointed Staff Assistant to the Motive Power Superintendent, Liverpool Street.

Mr. F. J. Langridge, Assistant Regional Welfare Officer, London Midland Region, British Railways, has retired after 50 years' service. Mr. Langridge was to be seen at every important railway sporting event not only on the London Midland but on other regions during the last 30 years. His experience on welfare work began in the very earliest days of the movement—he was one of the three pioneers who were deputed by the then General Manager, Sir Arthur Watson, to

form the Welfare Department. Mr. Langridge claims that the former L.M.S.R. was the first railway to do so.

STAFF CHANGES

The following staff changes are announced by British Railways, London Midland Region:—

Mr. A. F. Fielding, District Operating Superintendent, Leeds City, to be District Operating Superintendent, Leicester.

Mr. M. G. E. Lambert, Assistant to District Goods Superintendent, Broad Street, to be District Goods Superintendent, Warrington.

Mr. H. N. Wilson, Goods Agent, Coventry, to be Goods Agent, Nottingham (also i/c Radford, Manvers Street, Carington Street, Queens Walk and London Road).

Mr. S. Fowler, Assistant Yard Master, Grimsby Goods (Eastern Region), to be Stationmaster, Harrow & Wealdstone.

Mr. A. E. Conrad, H.O. Inspector, Euston C.S.O., to be Goods Agent, Nuneaton.

Mr. R. Blackburn, Stationmaster, Gourrock (Scottish Region), to be Stationmaster, Northampton, also i/c Northampton Bridge Street.

Mr. H. S. Barnes, District Inspector, Barnsley (Eastern Region), to be Stationmaster, Kettering.

Mr. R. S. Rigg, Goods Agent, Chelmsford (Eastern Region), to be Goods Agent, Kendal.

Mr. W. C. Thomas, Stationmaster/Goods Agent, Hellfield, to be Stationmaster/Goods Agent, Melton Mowbray.

Mr. A. Meir, Chief Booking Clerk, Derby, to be Passenger & Parcels Agent, Coventry.

Mr. G. F. H. McAvoy, Stationmaster, Queen Park, to be Stationmaster, Broad Street.

The following appointments have been made by Standing Committees of the Road Haulage Association:—

Public Relations Committee.

Chairman:—Mr. R. B. Brittain.

Vice-Chairman:—Mr. T. Lawrenson.

Licensing Committee.

Chairman:—Mr. J. B. Mitchell.

Vice-Chairman:—Mr. C. F. Russett.

The following appointments have been made by the National Road Transport Federation for the coming year:—

President:—Captain the Rt. Hon. Lord Teynham, D.S.O., D.S.C., R.N. (ret'd).

Vice-Presidents:—Major R. A. B. Smith, M.C., M.Inst.T., Mr. James Paterson.

Chairman:—Mr. F. J. Speight.

Vice-Chairmen:—*Mr. J. Janes, *Mr. C. W. H. Sparrow.

*Newly appointed.

Mr. V. Hall, Chief Mechanical Engineer and Workshops Superintendent, Queensland Government Railways, retired on June 30. He has been succeeded by Mr. W. A. Castley, Assistant to Chief Mechanical Engineer & Workshops Superintendent.

Mr. George Stiven, District Passenger Agent, Winnipeg, Canadian National Railways, has been appointed General Passenger Agent, with headquarters at Moncton, N.B. Mr. Stiven, whose appointment is effective August 1, succeeds Mr. F. L. Dougan, who is retiring.

The following Assistant Freight Traffic Managers, Chicago, Illinois Central Rail-

road, have been appointed Freight Traffic Managers: Mr. L. Godchaux and Mr. A. Sublett.

Mr. R. L. Andreas, General Freight Agent, Metropolitan Chicago Area Sales & Service Office, has been appointed Assistant Freight Traffic Manager, Chicago.

Mr. J. Burvant, Assistant (Special Duties) to General Traffic Manager, Chicago, has been appointed General Freight Agent, Chicago. Mr. Burvant will have jurisdiction over on-line sales and service offices in the mid-west.

Herr Wilhelm Winzler has retired from the technical editorship of the German signal and telecommunication engineering journal *Signal und Draht*, which he has held since February, 1929. Herr Winzler, who is 76, was for over 20 years in the engineering department of the German railways at Leipzig and Halle, transferring from the Reichsbahn to the Railway Department of the Ministry of Transport in Berlin in 1925, to deal with the public supervision of lines, both State and privately owned, and the drafting, amending and approving of rules and regulations.

Mr. K. Byard, Technical Manager in Durban, Dunlop Rubber Co. Ltd., will succeed Mr. A. T. Roberson, General Works Manager at Speke, as the company's Works Director in South Africa.

The directors of the Brush Electrical Engineering Co. Ltd. have agreed, at the request of Simms Motor Units Limited, to release Mr. John Ayres, Managing Director of Petters Limited, Staines, from his service agreements with the Brush Group, to enable him to take up the appointment of General Manager & Director of Simms Motor Units Limited on October 1, 1953. Captain R. C. Petter, a member of the Brush Board, will as from that date be appointed Managing Director of Petters Limited. Captain Petter has agreed to assume these responsibilities on a temporary basis until it is possible for the board to make a permanent appointment.

We regret to record the death, on August 2, of Major Sir Hew Kilner, M.C., formerly Deputy-Chairman of Vickers-Armstrongs Limited.

Mr. A. F. Roger has been appointed a Director of British Electric Traction Co. Ltd. in place of Mr. R. J. Howley, who has retired.

Mr. E. S. Waddington, F.S.E., A.M. (s.a.) I. Mech.E., M.Inst. W., Associate I.E.E., Associate (s.a.) I.E.E., of Philips Electrical Limited, Industrial Products Department, has been re-elected to the Council of the Institute of Welding.

MR. GEORGE ORTON

A cocktail party was held at the Great Western Royal Hotel, Paddington, on Thursday, July 30, to mark the retirement of Mr. George Orton after 50 years transport service (45 years railway service and 5 years with the Road Haulage Executive). Among those present were:—

The Rt. Hon. A. T. Lennox-Boyd, M.P., Minister of Transport, was the principal guest. Others present included:

British Transport Commission

Messrs. S. B. Taylor, Michael Gilmour, and J. H. Brebner.

Road Haulage Executive

Major-General G. N. Russell, Mr. Claud Barrington, Dr. Harold Clay,

Messrs. G. F. Sinclair, P. J. R. Tapp, G. W. Quick Smith, N. R. Bellwood, W. L. Morgan, S. E. Raymond, J. S. Nicholl, R. B. Hoff, W. C. Leslie-Carter, Harold Elliott, N. D. Fawcner, J. B. Garrett, J. L. Willoughby, D. H. Foulds, T. G. Gibb, E. G. Kedge, and G. C. Johnson.

Western Region

Messrs. K. W. C. Grand, and C. R. Dashwood.

Hotels Executive

Mr. W. R. Keith.

Railway Executive

Messrs. H. Adams Clarke, and H. H. Phillips.

Ministry of Transport

Messrs. S. W. Bainbridge, and A. Dickson Wright.

Among a number of other personal friends of Mr. Orton who attended were Mr. David Grand and Mr. A. Dickson-Wright, and the editors or senior representatives of a score of newspapers and periodicals, the B.B.C., the Press Club, and so forth.

Institution of Civil Engineers

The following have become Graduates of the Institution:—

Mr. A. J. Naughton (Messrs. Rendel, Palmer & Tritton), Mr. F. Sutcliffe (East African Railways & Harbours).

Institution of Mechanical Engineers

The following is a selection of names from a list of recent elections to the Institution of Mechanical Engineers:—

Associate Members:—Mr. W. H. Brittain, the Crown Agents for the Colonies Mr. P. Burylo, B.Sc., Brush Electrical Engineering Co. Ltd., Mr. J. A. Gnanapragasam, Ceylon Government Railway, Mr. A. A. Jones, General Electric Co. Ltd., Mr. N. G. Kennedy, B.Sc., Mechanical Engineering Research Organisation, Lt-Commander (E) J. S. C. Lea, R.N., Vickers Armstrongs Limited, Mr. A. C. Livingston, Glenfield & Kennedy Limited, Mr. E. L. Mercer, B.Sc.Tech., General Electric Co. Ltd., Mr. R. L. Stowell, B.Sc., I.C.I. Limited.

SENTINEL (SHREWSBURY) LIMITED.—Net profit of Sentinel (Shrewsbury) Limited for the year to March 31 was up by £10,416 at £36,101. Carry-forward is increased from £158,231 to £166,438. The dividend is maintained at 5 per cent.

ELECTRONICALLY CONTROLLED WELDING.—A comprehensive range of welding equipment and motor-driven welding manipulators will be included among the exhibits displayed by the Metropolitan-Vickers Electrical Co. Ltd. at the Engineering & Marine Exhibition, Olympia, London, September 3-17. The exhibits include resistance, automatic arc, inert arc, and atomic hydrogen welding equipment. The types include resistance welding machines; 10-kVA, 25-kVA, and 60-kVA spot welders, with electronic control of the weld time; automatic welding equipment with welding speeds from 3½ in. to 55 in. a minute incorporating a railed track; and an atomic hydrogen welding set for use in the chain-making industry. Welding manipulators will include one with a loading capacity of two tons, centre of gravity 9 in. above the table top, and 6 in. out of balance. Other exhibits include an engine room control desk for a 600-s.h.p. diesel-electric vessel, and a steam turbine control desk for an 8,000-s.h.p. cargo vessel.

British Transport Commission Statistics (Period No. 6)

Summary of the principal statistics for the four-week period ending June 14

STAFF

—	B.T.C. Head Office	British Railways	London Transport	British Road Services	Road Passenger (Provincial)	Hotels & Catering	Ships & Marine	Inland Waterways	Docks, Harbours, Wharves	Railway Clearing House	Commer- cial Adver- tisement	Legal	Films	Total
Number ...	284	603,043	96,414	69,873	62,186	16,547	6,512	4,732	21,022	541	202	329	43	881,728

BRITISH TRANSPORT COMMISSION TRAFFIC RECEIPTS

—	Four weeks to June 14		Aggregate for 24 weeks	
	1953	1952	1953	1952
	£000	£000	£000	£000
British Railways—				
Passengers	10,055	9,560	46,423	45,083
Parcels, etc., by passenger train	2,940	2,763	17,097	16,073
Merchandise	7,623	7,772	49,380	49,069
Minerals	3,257	3,135	21,084	19,332
Coal & coke	7,596	7,396	51,150	47,570
Livestock	167	105	921	681
Total British Railways	31,638	30,731	186,055	177,808
British Railways, C. & D., etc.	857	839	5,331	5,257
British Road Services	5,700	5,709	35,934	35,668
Provincial & Scottish Buses	3,989	3,926	20,639	19,569
London Transport—				
Railways	1,471	1,408	8,309	8,098
Buses & coaches	3,332	3,217	18,140	17,322
Trolleybuses & trams	719	780	4,165	4,433
Total London Transport	5,522	5,405	30,614	29,853
Ships	958	995	4,140	4,256
Inland Waterways : Carrying	74	73	425	412
Total Passengers	20,034	19,377	99,306	96,125
Total Freight, Parcels & Mails	28,704	28,301	183,832	176,698
Inland Waterways : Tolls, etc.	101	100	634	625
Docks, Harbours, etc.	1,291	1,300	7,312	7,304
Hotels & Catering—				
Hotels	450	455	2,481	2,561
Restaurant cars	259	254	1,279	1,280
Station refreshment rooms	703	603	3,571	3,231
Total Hotels & Catering	1,412	1,312	7,331	7,072
TOTAL	51,542	50,390	298,415	287,824

LONDON TRANSPORT

—	Passenger journeys	Inc. or dec. per cent over 1952	Car miles	Inc. or dec. per cent over 1952
Railways	000		000	
Buses & coaches	49,828	+15.5	17,344	+3.8
Trams & trolleybuses	235,006	+3.7	27,605	+1.4
	59,521	-4.8	5,765	-9.1
Total	344,355	+3.6	50,704	+0.9

INLAND WATERWAYS

Tonnage of traffic and ton miles

—	Tonnage	Inc. or dec. per cent over 1952	Ton miles	Inc. or dec. per cent over 1952
Coal, coke, patent fuel & peat	000		000	
Liquids in bulk	497	+2.3	7,332	+11.5
General merchandise	136	-7.2	3,541	-3.0
	286	-3.2	4,625	-7.2
Total	919	-1.0	15,498	+1.9

BRITISH RAILWAYS

Rolling Stock Position

—	Operating stock	Number under repair	Available operating stock	Available stock in 1952
Locomotives	18,672	3,054	15,618	15,769
Coaching vehicles	57,245	5,002	52,243	52,383
Freight wagons	1,120,354	84,301	1,036,053	1,038,595

BRITISH RAILWAYS Passenger Journeys (Month of May, 1953)

Full fares	Excursions, cheap day, etc.	Other descriptions	Early morning and workmen	Season tickets	Total	Inc. or dec. per cent over 1952
19,310,000	22,384,000	4,242,000	15,903,000	15,770,000	77,609,000	+1.5

BRITISH RAILWAYS Freight Tonnage Originating and Estimated Ton-Miles (Period No. 6)

—	Merchandise	Minerals	Coal & coke	Livestock	Total	Inc. or dec. per cent over 1952
Tons originating	000	000	000	000	000	
Ton-miles	3,482	4,623	12,326	50	20,481	-3.5
	482,581*	274,776	734,355	—	1,591,712	-4.0

* Includes livestock

BRITISH RAILWAYS (Period No. 6)

—	Total steam coaching train-miles	Total electric coaching train-miles	Total freight train-miles	Freight train- miles per train engine-hour	Net ton-miles per total engine-hour	Locomotive coal consumption	
						Total tons	Lb. per engine-mile
1953	14,880,000	3,798,000	9,973,000	9.08	626	945,000	59.0
1952	14,492,000	3,783,000	10,561,000	9.17	618	956,000	58.4

Parliamentary Notes

Future of British Transport Commission and Executives

Statement by Minister of Transport: with the exception of London Transport, Executives not to continue after September 30; Lord Hurcomb to retire

In the House of Commons on July 29, after Questions, Mr. Alan Lennox-Boyd (Minister of Transport) made the following statement:

"As regards the Commission itself, Lord Hurcomb told me some time ago that he did not seek reappointment at the end of his present term of office on August 31 next. Sir William Wood has also said that he would like to retire on that date. The rest of the Commission will, I am glad to say, remain and their great knowledge and experience will be available so that there will be no break in continuity. The House will remember that the size of the Commission is increased by the 1953 Act from nine to fifteen.

Chairmanship of B.T.C.

"The chairmanship of the Commission demands of its holder qualities not easily to be found. I have devoted much thought to this question and have narrowed the field, but I am not yet in a position to say who the new Chairman will be. Pending his appointment I should not think it right to appoint any new Members, whole or part-time, to the Commission."

After consultation with the Commission, Mr. Lennox-Boyd added, he had decided that the Executives, with the exception of London Transport, should not continue after September 30 next. He would like to take this opportunity of expressing his gratitude to those Executives for the energy and devotion they had brought to their tasks, and to their staffs of all ranks who had stood loyally by them during a difficult period. The Transport Act, 1947, envisaged that the Executives would not necessarily be permanent institutions and their cessation at this juncture, except in the case of London Transport, would, in the Commission's view, help it in the discharge of its duties.

Railway Executive

In appropriate cases full-time Members of the Executives would be given the opportunity to continue to serve the Commission as its officers. For instance, nearly all the full-time Members of the Railway Executive had had life-long experience on the railways, and had attained leading positions in their profession.

Mr. Lennox-Boyd went on to say that he understood also from the B.T.C. that it intended that the present Chairman of the Road Haulage Executive (Maj.-General G. N. Russell) should be offered a senior post in its organisation and that other steps should be taken to ensure continuity of operation.

London Transport

As to the London Transport Executive, he continued, Lord Latham had announced publicly some time ago his intention of resigning the chairmanship of the Executive at the end of his present period of office. This was a position of high importance requiring not only a wealth of skill and experience, but also a keen realisation of the views and feelings of the public on matters relating to their daily travel.

He was giving close thought to the

appointment of Lord Latham's successor. In the circumstances, however, he thought it desirable to reappoint all the present Members of the London Transport Executive, apart from the Chairman, for a period of one year. This would not preclude their reappointment later for a longer period, and London Transport must remain, for as far as one could foresee, one of the most important transport entities in the world.

Work of Lord Hurcomb

"Time does not permit me to pay, at this moment, an adequate tribute to Lord Hurcomb," Mr. Lennox-Boyd said. "As one of the greatest of our civil servants, he has brought the highest qualities to the discharge of the onerous duties placed upon him by the 1947 Act; and this is not the first or only office in which he has given great service to the nation."

The thanks of all Londoners were due to Lord Latham for his work in administering the elaborate network of services upon which millions of people depended. An organisation of this kind could attain the requisite pitch of efficiency only at the cost of continual effort and search for improvement, but London Transport as Lord Latham left it, was without doubt the finest metropolitan transport system in the world.

Sir Michael Barrington-Ward

Reference was then made by Mr. Lennox-Boyd to the retirements on September 30 of Sir Michael Barrington-Ward, Member of the Railway Executive, and on August 31 of Sir William Wood. "The retirement of these eminent railwaymen," he said, "will be a great loss to the Commission and to the railways, and I should like to pay a tribute to their long and distinguished service."

Apart from those he had mentioned there would be few other retirements and if time did not permit him to refer in detail to the services of those concerned, it did not mean that he did not realise the hard work, the ability, and the devotion which they had brought to their tasks. "The fact that in some directions the Commission will be making a fresh start," he concluded, "does not detract from the thanks which the whole House will feel are due to those who are now laying down the burden of their office."

Mr. Herbert Morrison (Lewisham S.—Lab.) expressed his appreciation of the services of Lord Hurcomb as Chairman of the B.T.C., and reminded the House that Lord Hurcomb was the first Permanent Secretary with whom he had worked as a Minister. He had a high estimate of his abilities. He also praised the work of Lord Latham.

The statement by Mr. Lennox-Boyd was most unsatisfactory, he added. The Minister had known for some time that the vacancy of Chairman of the B.T.C. would arise, so why could the Government not make up its mind?

Proposed Action Not Decentralisation

Abolition of the Executives, except for London Transport, Mr. Morrison continued, was not the decentralisation which

the Government professed as a policy. The B.T.C. was alleged to agree with the Minister's decisions; they should be allowed to see the Commission's letter expressing its agreement. The Minister was transforming persons now members of boards into subordinate officials. He also criticised the delay in appointing a successor to Lord Latham.

Early Debate Desirable

It was a great pity, Mr. Morrison went on, that the announcement should be made on the eve of the recess. It was characteristic of the dishonesty of the Government and particularly of the Minister that the House should be held up on a matter that ought to command a good deal of debate. The Opposition would require an early opportunity to debate the question.

Mr. Lennox-Boyd said he was anxious to get the best Chairmen for the B.T.C. and the London Transport Executive. He was more concerned about getting the right people than in coming to a hasty decision on matters involving millions of people and public credit.

Concurrence of B.T.C.

It was by the unanimous wish of the Commission, he added, that he took this action. The Commission had satisfied him that Executives appointed by the Minister and not by the Commission was not the best way. This had been the Conservative Party view in 1946, when nationalisation of transport was being discussed.

How far the action to be taken would result in more centralisation, would depend on the scheme for reorganising the railways. As to the correspondence with the B.T.C., apart from saying that the Commission was in entire agreement with his decision to end the Executives, he would not quote the contents.

Control during Interim Period

Mr. Ernest Davies (Enfield E.—Lab.) said it would have been better to have waited for the railway reorganisation before discontinuing the Executives. He asked what form of management there would be in the interim period. Was the B.T.C. to act as a functional body?

Mr. Lennox-Boyd said he had seriously considered continuing the Executives for a short period until the new B.T.C. Chairman was appointed and the new Commission established, but on the urgent entreaty of the Commission itself, which represented that a continuance of the uncertainty was highly undesirable, he had come to the conclusion not to reappoint the Executives.

As to the interim period, under the 1947 Act, the powers and authority of the Executives now reverted automatically to the Commission, which had always been in a position to issue directives to the Executives.

The Commission, whose responsibility it would be, would at an early date make it quite plain what form the organisation would take after next September, though the full railway scheme would take a good deal longer.

In reply to a representation by Mr. Morrison that the Government had not previously intimated its intention of abolishing all the Executives, Mr. Lennox-Boyd said the Executives were not subject to exactly the same considerations. The Railway Executive had to come to an end with the making of the railway scheme. He was told that the uncertainty was bad for all concerned and that it was better to make it plain now. The Road Haulage Executive would come to an end at the end of the disposal of the road haulage vehicles, and he was told that the anxiety was bad there; they were ending it there, too.

Docks and Inland Waterways

Docks and canals as part of the Commission could be better administered than as a separate Executive, though there was no question of their passing into railway control. He had not abolished all the Executives; London Transport would remain separate.

Chairman of Railway Executive

To a question as to the future of the Chairman of the Railway Executive (Mr. John Elliot), Mr. Lennox-Boyd replied that it would be most unwise to be drawn into the question of the future of any individual. He had made an exception in the case of Maj.-General Russell, because the new Act created more change in road haulage than anywhere else, and he wished to make clear that the services of the Chairman of the R.H.E. would be available to the Commission as one of its senior officers.

Mr. L. J. Callaghan (Cardiff S.E.—Lab.) pointed out that during the interim period the B.T.C. would have only three experienced Members, besides taking over the work of the Executives. The Minister was causing turmoil by immediate centralisation.

South Wales Docks

Abolition of the Docks & Inland Waterways Executive, he added, would cause dismay in S. Wales ports, where, for the first time since 1947, they had been able to get free from the grip of the railways and act independently. He asked the Minister to reconsider discontinuance of this Executive in view of the position in S. Wales.

Mr. Lennox-Boyd indicated dissent.

Closing of Branch Lines

Mr. E. M. Cooper-Key (Hastings—C.) on July 28, on the motion for the adjournment, said he wished to protest against the withdrawal of the Kent & East Sussex line passenger service and to raise the matter of the attitude of the B.T.C. to withdrawing local services generally. Branch line services should not be withdrawn, but steps taken to provide a better service, as by dieselisation of passenger services. Withdrawal of passenger services in rural areas was adversely affecting the national economy by making country life less attractive.

Alternative road services, he continued, were not always available. The K. & E.S. line had been referred to the local Transport Users' Consultative Committee, but locally, nobody knew who that body was or where it met.

Nobody doubted that the Railway Executive could, and intended to, withdraw the passenger service. The nationalised industries had a responsibility to the rural areas; they had an example in the Post Office.

Mr. Alan Lennox-Boyd (Minister of Transport) pointed out that objections to closing could be lodged with the Central Transport Users' Committee, without whose consent no branch ever had been closed. If, however, the railways were to play their proper part they must run themselves as a business entity.

Under the new Act the railways would have a measure of freedom unique in the world. Even if he had the power, he could not make them work lines without a hope of economic success. When by closing branches they already were going to save £1,250,000 a year, that might enable them better to serve the millions who used British Railways.

Dieselisation

Experiments with multi-unit diesel trains were to be made, he went on, in Scotland and Yorkshire, though experience suggested that they were economic only when the density of traffic was very heavy. The initial cost of a diesel locomotive was considerable.

Mr. Lennox-Boyd went on to explain the procedure for dealing with proposals for withdrawing services. As to the K. & E.S. line, the Railway Executive had shown that in the week ended January 28 the maximum number of passengers using any one train had been eight, the average five, with 118 over the whole line in 80 different trains. That did not justify a bus service in lieu of the trains, and the area was served by other bus routes not along the railway route.

Mr. C. J. M. Alport (Colchester—C.), raising the matter of the Brightlingsea branch, which he said was similar, complained that British Railways had not tried to attract traffic. Certain members of Consultative Committees represented the railways; but the committees should be quite independent both of the local interest and the Railway Executive.

British Transport Commission Bill

The British Transport Commission Bill, as amended, was read the third time in the House of Lords on July 28.

Economic Advantages of Electric Traction

Experience with d.c. and a.c. systems in France

At the invitation of the Danish group of the Institution of Civil Engineers in France, Monsieur Tessier, of the Research Department of the S.N.C.F., recently gave two talks in Copenhagen, one at the Danish Institution of Civil Engineers, and one before the Traction Committee of the Danish State Railways.

A report of these talks in our Danish contemporary, *Ingeniøren*, shows that Monsieur Tessier listed five basic advantages inherent in railway electrification. First, there was the saving in traction costs. The thermal efficiency at the drawbar was increased from 5.4 per cent (steam) to 12 per cent (electric), but owing to the possibility of using low-grade coal for electricity production, the consumption of high-grade coal could be reduced to one-fifth for the same traffic intensity. In France, further savings could be made by using hydro-electric power. The annual saving in coal was put at 3.1 million tons. In terms of money, the cost of traction energy was reduced by 50-60 per cent in the traffic conditions prevailing on the French railways selected for electrification.

Owing to the instant readiness and greater operating efficiency of the electric locomotive, which permitted a much improved use of staff, there was a considerable saving in labour. In many cases, the electric locomotives could be one-man operated, so that the cost of staff was reduced to about one-third.

The maintenance cost for locomotives had been reduced from between fr. 90 and 50 per km. to something between fr. 22 and 16 per km., according to the type of locomotive. This saving was due mainly to the fact that the electric locomotive need not be inspected more than once a month, with a main overhaul after 300,000 km.

A fourth factor was the saving in capital cost and depreciation. An electric locomotive could perform the work previously carried out by three steam engines. But the first cost of an electric locomotive was only twice that of a steam engine, and could be reduced further as

they were produced in greater numbers, and with greater production experience.

Finally, under his fifth heading, Monsieur Tessier mentioned advantages such as reduced journey times, improved time-keeping capacity, and greater cleanliness. For example, operation of the Paris-Lyons line was characterised by heavy passenger and goods traffic. The former was largely concentrated in the night trains; at public holidays, up to 50 express trains left Paris between 6 p.m. and midnight, some of them following each other at 2-min. intervals at speeds of up to 140 km.p.h. Up traffic to Paris was equally "bunched." This was why the two tracks on the "bottleneck" near Dijon were both signalled for two-way movement.

So far, experience on this line suggested a saving in working expenses of over 50 per cent and an overall saving, after deduction of capital costs, of 7 per cent. There had been a trend towards using lighter locomotives which gave a higher output per ton and were considerably cheaper to maintain. It was planned to use, to some extent, locomotives of still simpler design, with a single driving compartment in the centre of the vehicle.

Cheaper Electrification System

At present, railway electrification in France was confined to 10 per cent of the route-mileage, carrying 30 per cent of the traffic. On lines with less intensive traffic, the 1,500-volt d.c. electrification system was not expected to be a paying proposition. It was therefore proposed to adopt the 50-cycle a.c. system at 20,000 volts which, owing to the elimination of transformers and rectifiers, and the reduced cost of the overhead system, was about 35 per cent cheaper in first cost, whilst the locomotives, though more complicated, were now no more expensive than 1,500-volt d.c. locomotives.

In round figures, the economic criterion for the adoption of 1,500-volt d.c. electrification was a coal consumption of 450-500 tons per km. per annum, whilst the corresponding figure for 50-cycle electrification was 300 tons only.

German Transport Exhibition

Displays at Munich include the latest designs of Federal Railway motive power

The German Transport Exhibition at Munich, open until October 11, covers an area of over 5,600,000 sq. ft. including over 600,000 sq. ft. in fourteen exhibition halls, with an area of 1,400,000 sq. ft. for exhibits such as railway track layouts, a cableway, and a 1½-mile miniature railway. An exhibition hall and congress hall also have been added to the existing buildings of the Munich exhibition ground. All forms of modern transport are represented and many exhibits are contributed by manufacturers of railway material.

The German Federal Railway is the major exhibitor. Its most interesting diesel exhibits are the two *gliedertriebzüge*, seven-car sets built of light metal and powered by four 160 b.h.p. road transport oil engines which transmit their output through a new form of hydro-mechanical drive. These trains, built by a combination of firms, are the joint property of the Federal Railway and the German Sleeping & Dining Car Company (D.S.G.); one is a day train with kitchen and restaurant service, the other a sleeping car train.

Diesel Locomotives and Railbuses

Main-line diesel locomotives are represented by two 2,000 b.h.p. double-engine diesel-hydraulic locomotives with mechanical portion by Krauss-Maffei. They are intended for light and medium weight trains running to fast schedules, and it is believed that they are to be used primarily on special mail trains run in conjunction with the German Post Office. Five are on order; of the two completed one is in the Federal Railway hall and the other, attached to three main sorting vans, in the Post Office hall. Also on

show are one of the triple-car diesel-hydraulic trains introduced into regular service during the summer and autumn of 1952, and equipped variously with Maybach, M.A.N., and Daimler engines and Voith or Mekydro transmissions; the Uerdingen four-wheel diesel railbus ("VT.95" class), and its new development, a double-engine railbus of over 200 b.h.p. known as class "VT.98," coupled to a special railbus trailer; and a single-axle railbus-trailer intended for the conveyance of skis and light parcels in mountain districts. Private exhibitors showing diesel railway stock include Krauss-Maffei, Deutz, Maschinenbau Kiel A.G., and Waggonfabrik Talbot A.G.

Electric and Steam Exhibits

Electric and steam traction exhibits include a new 4,600 h.p. class "E.10" electric locomotive, and a class "23" and class "45" steam locomotive. The class "45" engine, a 2-10-2 goods with ten-wheel tender, stands near to a reproduction of the first German steam locomotive, *Adler*, built in 1835. Visitors may drive a diesel or steam locomotive on a fully-signalled demonstration track.

Passenger rolling stock is represented by a convertible coach for day and night travel, and a compartment coach for international service. There are a number of wagons of various types exhibited for general and special traffic.

Container and refrigerator traffic, handling facilities and developments in mechanisation, and designs for stations and bridges are shown in models. The Federal Railway telephone network also is demonstrated. Permanent way displays show the development of the present stan-

dard track with concrete sleepers and long-welded rails, mechanised track laying, and rail grinding. Urban transport undertakings are showing new tramcars and underground railway rolling stock.

Contracts & Tenders

The South African Railways have placed an order with Alpini Montan Gesellschaft, Austria, for 8,000 tons of rails worth £270,000.

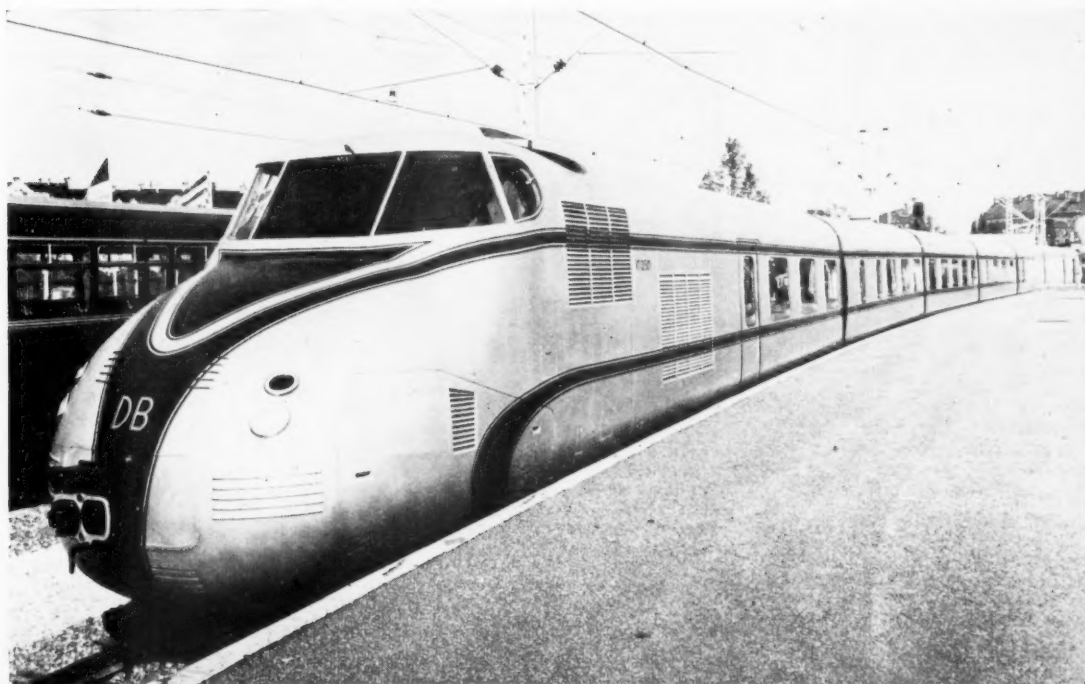
Coras Iompair Eireann is to import from the General Steel Castings Corporation 200 steel castings for coach bogie frames.

Matisa Equipment Limited has received an order for the supply to the Burma Railways of two Matisa ballast tampers, with off-tracking equipment and spares. The order was signed during the recent visit of the Burma Purchasing Mission.

The six diesel-hydraulic locomotives which the S.A. des Forges, Usines et Fonderies de et à Haine-Saint-Pierre is to build for service in the Congo, as announced in our July 17 issue, are intended for the Chemins de fer du Congo Supérieur aux Grands Lacs Africains and not for the Bas Congo-Katanga Railway.

A contract for the resignalling of Cowairs (Glasgow), Scottish Region, British Railways, has been awarded to the Westinghouse Brake & Signal Co. Ltd., which will be responsible for the supply and installation of the whole of the signalling apparatus.

This installation, at present operated from eight mechanical signalboxes, will be replaced by the Westinghouse O.C.S. system from a control desk and diagram in one central signalbox. It will include multi-aspect colour-light signals with position light subsidiaries, junction and route



New seven-car 640-b.h.p. diesel train of the German Federal Railway, on show at the Munich Exhibition

indicators, electro-pneumatic points and a.c. track circuits; remote points will be electrically operated. Plug-in relays will be used throughout. Standby power plant and main and standby compressor plant are also included.

The whole installation covers approximately 14 track miles and includes work in connection with three adjoining mechanical boxes.

The Chilean State Railways has ordered two 3,000-kW., 3,000-volt d.c. ignitron substations for its Santiago-Valparaiso electrified line from Westinghouse Electric International Company. Each substation will consist of an ignitron rectifier and switchgear and transformers. The rectifiers will be installed first at existing substations to replace motor-generator sets scheduled for their first complete overhauling since 1922, when Westinghouse supplied all electrical equipment for the original electrification. Eventually the apparatus will form new substations at two points on the line where heavy gradients and heavy traffic place a strain on existing facilities.

The Director General of Supplies & Disposals, Railway Stores Directorate, New Delhi, is inviting tenders for 90 buffer plungers steel Class II or Steel Casting.

Tenders are to be submitted to the Director General of Industries & Supplies, Shahjahan Road (Section SRI), New Delhi, quoting reference SRI/16477-D/III. They will be received up to 10 a.m. on August 18, and opened at 11.30 a.m. on that day.

The Special Register Information Service of the Board of Trade, Export Services Branch, reports that the United Kingdom Senior Trade Commissioner in Pakistan has notified a call for tenders (invitation number M.1/1/26110) by the Department of Supply & Development, Government of Pakistan, for:—

- 14 axles, straight, inside journal.
- Four axles, straight, inside journal.
- 16 axles, straight, inside journal.
- 14 tyres, flanged stud fastening type.
- 450 tyres, flanged, stud fastening type, 3 ft. 0 $\frac{1}{2}$ in. bore, 3 ft. 7 $\frac{1}{2}$ in. dia., on tread (rolled section).
- 20 tyres, flanged, stud fastening type, 2 ft. 1 $\frac{1}{2}$ in. bore, 2 ft. 6 $\frac{1}{2}$ in. dia., on tread (rolled section).
- 28 tyres, flanged, stud fastening type, 1 ft. 3 $\frac{1}{2}$ in. bore, 1 ft. 9 $\frac{1}{2}$ in. dia., on tread (rolled section).
- 22 tyres, flanged, stud fastening type, 2 ft. 0 $\frac{1}{2}$ in. bore, 2 ft. 6 $\frac{1}{2}$ in. dia., on tread (rolled section).
- 270 tyres, flanged, stud fastening type, 4 ft. 1 $\frac{1}{2}$ in. bore, 4 ft. 8 $\frac{1}{2}$ in. dia., on tread (rolled section).
- 135 tyres, flanged, stud fastening type, 4 ft. 6 $\frac{1}{2}$ in. bore, 5 ft. 1 $\frac{1}{2}$ in. dia., on tread (rolled section).
- 16 tyres, flanged, stud fastening type, 5 ft. 7 $\frac{1}{2}$ in. bore, 6 ft. 2 $\frac{1}{2}$ in. dia., on tread (rolled section).
- 40 tyres, flanged, rivet fastening type, 4 ft. 7 $\frac{1}{2}$ in. dia. x Orgl. of wheel centre, 4 ft. 6 $\frac{1}{2}$ in. bore and 5 ft. 1 $\frac{1}{2}$ in. dia., on tread (rolled section).
- 90 tyres, flanged, rivet fastening type, 5 ft. 7 $\frac{1}{2}$ in. bore, 6 ft. 2 $\frac{1}{2}$ in. dia., on tread (rolled section).
- Four pairs wheels complete with roller bearings and axleboxes, suitable for all-steel lightweight carriages (broad gauge).

Tenders close at 8 a.m. on August 31. A copy of the tender specifications may be inspected by representatives of United Kingdom firms in Room 801 at Lacon House, Theobalds Road, London, W.C.1.

The Director General of Supplies & Disposals, Railway Stores Directorate, New Delhi, is inviting tenders for 180 axleboxes, 10 in. by 5 in. journal (broad gauge).

Tenders are to be submitted to the Director General of Industries & Supplies, Shahjahan Road (Section SRI), New Delhi, quoting reference SRI/16496-D/I. They will be received up to 10 a.m. on August 17 and opened at 11.30 on that day.

The Special Register Information Service of the Board of Trade, Export Services Branch, reports that it has been notified by the Commercial Secretary of the British Embassy at Montevideo that the Administracion de Ferrocarriles del Estado, Uruguay, has issued a call for tenders for the supply of vulcanised fibre insulating joints for railway tracks.

The vulcanised fibre shall conform to B.S.S. No. 216-1936. Should other than vulcanised fibre be used, the substitute material must be equal to or superior to that specified, in all its conditions, for the established use.

A complete list of the individual items required under this tender is given in the official specification which includes detailed drawings and descriptions. One copy of this specification is held in Room 801 at Lacon House, Theobalds Road, W.C.1, where it will be available for inspection until August 14; after this date it will be available on loan to United Kingdom firms in order of application. The closing date for the receipt of tenders is September 18 at 3 p.m.

ANTOFAGASTA (CHILI) & BOLIVIA RAILWAY CO. LTD.—A dividend of 2 $\frac{1}{2}$ per cent. on the £2 million of 5 per cent cumulative preference stock of the Antofagasta (Chili) & Bolivia Railway Co. Ltd., now announced, will bring arrears paid on this stock up to June 30, 1945.

Notes and News

Vacancy for an Engineer.—An engineer, between 30 and 35 years of age is required in the London drawing office of a firm of rubber consultants and manufacturers. See Official Notices on page 167.

Senior Civil Engineer Required.—Applications are invited for the post of senior civil engineer required by consulting engineers for railway survey and construction in the Gold Coast. See Official Notices on page 167.

Brazilian Company Change.—Turner & Newall Limited, on behalf of one of their subsidiaries, Ferodo Limited, have acquired a controlling interest in a Brazilian brake lining company, Industria Nacional de Lonas Para Freio S.A.

Vacancy for Traffic Assistant.—Applications are invited for the post of traffic assistant required on a British railway operating in Bolivia. Traffic department experience essential. See Official Notices on page 167.

Two Assistants Required for Railway Civil Engineer's Office.—Applications are invited for the posts of two assistants required for railway civil engineer's department in London. For particulars of these appointments see Official Notices on page 167.

North Eastern Region Bank Holiday Arrangements.—Special trains run by the North Eastern Region during the August Bank Holiday period totalled 372. From the West Riding 136 relief trains were run, 40 being to London; others served Glasgow, Morecambe, Southport, Manchester, Scarborough, Paignton, Bournemouth, and Stranraer. From other parts of the Region there were 34 main-line relief trains to

Luncheon to Eastern Region Railwaymen Mayors



Mr. C. K. Bird (front row centre) Chief Regional Officer, with members of Eastern Region staff elected as mayors or deputy mayors of boroughs

OFFICIAL NOTICES

The engagement of persons answering Situations Vacant advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 inclusive, or a woman aged 18-59 inclusive unless he or she, or the employment, is excepted from the provisions of the Notification of Vacancies Order, 1952.

BEARINGS: 250 brand new Timken taper roller bearings 598/592 for sale, new stock, surplus to requirements. Box 905, *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

ENGINEER ESTIMATOR, or Surveyor/Estimator experienced preparation Civil Engineering tenders, preferably with knowledge of Railroad construction. The position is permanent, good salary and prospects. House available if required. Apply EAGRE CONSTRUCTION CO. LTD., Scunthorpe, Lincs.

SITE ENGINEERS required, experience in Railway construction preferred but not essential. Good prospects with permanent employment for suitable applicants. Apply in first instance to EAGRE CONSTRUCTION CO. LTD., Scunthorpe, Lincs.

ENGINEER required by well-known firm of Rubber Consultants and Manufacturers in London Drawing Office with view to eventually taking control. Permanent position and superannuation fund. Salary commensurate with qualifications and experience. Applicants should preferably be aged 30 to 35 and have some Railway experience. Write stating age, qualifications and experience to Box 903, *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

N.E.R. HISTORY.—Twenty-Five Years of the North Eastern Railway, 1898-1922. By R. Bell, C.B.E., Assistant General Manager, N.E.R. and L.N.E.R. Companies, 1922-1943. Full cloth. Cr. 8vo. 87 pages. 10s. 6d.—*The Railway Gazette*, 33, Tothill Street, London, S.W.1.

London and Scotland. Of a total of 142 excursions to the seaside originating in the Region, 38 were to Scarborough, 25 to Blackpool, and 22 to Morecambe. Seats were reservable in 50 relief trains, and 26 included refreshment cars.

Great Northern Railway Company (Ireland).—The board of the Great Northern Railway Company (Ireland) states that the results of working for the half-year ended June 30, 1953, do not allow of any interim dividends being paid on the guaranteed, preference or ordinary stocks.

Five Shilling Airport Fare Withdrawn.—The 5s. charge at State airports, introduced in May, 1952, and paid by all passengers going abroad, is being withdrawn. Compensatory revenue will be raised by increased landing fees next Spring. The probable effect of increasing aircraft landing fees will be to compel the airlines to pass on the extra charge in raised fares.

Arrival of British-Built Coaches for Toronto Underground.—The first two of the 104 underground coaches being built for the Toronto Transportation Commission by the Gloucester Railway Carriage & Wagon Co. Ltd. have arrived in Toronto. They will be displayed to the public before the opening of the Canadian National Exhibition at the end of the month.

Welsh Land Cruise: Daily Service from Chester.—British Railways, London Midland Region, experimental land cruise from Chester on Wednesdays, is to run daily, Mondays to Fridays, from August 4-28. This 93-mile cruise by luxury train follows the estuary of the Dee and coast line to Rhyl, where there is a stay of 2 hr., thence through the Vale of Clwyd to Corwen and along the Valley of the Dee to Llangollen. The return to Chester

CIVIL ENGINEER (Senior) required by Consulting Engineers for railway survey and construction in the Gold Coast. First tour of about two years followed by leave on full pay and possible second tour. The first 8/10 months will be spent as head of a survey party under the Chief Engineer, the remainder as Deputy Resident Engineer supervising construction. Salary £1,600 to £2,000 per annum according to qualifications and experience. Free quarters with essential furniture provided and free passages. Apply by letter with full particulars of age, qualifications and experience to RENDEL, PALMER & TRITTON, 125, Victoria Street, S.W.1.

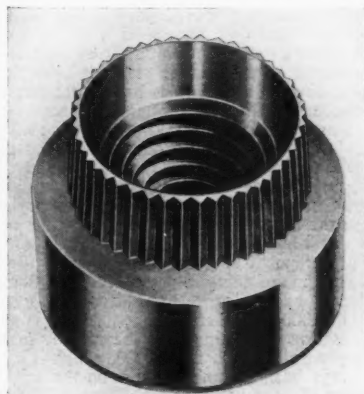
THE PERUVIAN CORPORATION have the following vacancies on the railways in Peru—**CENTRAL RAILWAY, ACCOUNTANT** (Traffic Auditor). About 30 years of age, preferably single with general auditing and railway accounting experience. **NORTHERN RAILWAYS, DIESEL ENGINEER** with practical experience on diesel locomotives and railcars and workshop management. **Southern Railway, ASSISTANT CHIEF STOREKEEPER**—an experienced Railway Storekeeper with a knowledge of Spanish essential. **GUAQUI LA PAZ RAILWAY—ASSISTANT ACCOUNTANT**—Qualifications: man who has passed Intermediate Examination of recognised accountancy body preferred. Knowledge of railway accounts an advantage. Preferably single between 28/35 years of age. A knowledge of the Spanish Language is preferable in all these appointments or willingness to learn within 6 months. Apply: SECRETARY, 144, Leadenhall Street, London, E.C.3.

TRAFFIC ASSISTANT required on British Railway operating Bolivia. Traffic Department experience essential. Preference given to candidates with knowledge of Spanish. Commencing £700 p.a., rising £950, plus free quarters, passages, allowances, etc. Write Box 6949, c/o CHARLES BARKER & SONS LTD., 31, Budge Row, London, E.C.4.

GLOUCESTER RAILWAY CARRIAGE & WAGON CO. LTD., Gloucester, require the services of experienced roller-stock Draughtsmen. Five-day week. Staff pension scheme. Apply, stating age, details of experience and salary required, to CHIEF DESIGNER.

is via Ruabon and Wrexham. There are two other cruise trains from Llandudno and Rhyl, introduced in the 1951 programme, which run every weekday except Saturdays.

Rivet Nut for Sheet Metal.—A device which can be used for railway carriage and road transport vehicle construction is the Anchor rivet bush, a product of the Precision Screw & Manufacturing Co. Ltd. of Willenhall, Staffs. As shown in the accompanying illustration, the rivet bush consists of a short cylindrical nut with a screwed bore and a thin, serrated finely tapered projection at one end. To fix the bush to a panel, the serrated projection is forced into a suitably sized hole until the shoulder of the bush butts up against the sheet metal. The serrations cut their way into the edge of the hole so that, when the projection is riveted over, the



The rivet bush, showing the serrated portion which prevents the bush from rotating

A VACANCY exists in the Chief Engineer's Dept. of a large integrated Iron & Steel Works in North Lincolnshire for a Superintendent of Permanent Ways. Applicants must have a thorough knowledge of the subject particularly in the layout and maintenance of marshalling yards and sidings. Ability to prepare own scale drawings, quantities and estimates; maintenance of stock records and experience in handling a substantial labour force are essential attributes. Applications should include details of age, training, qualifications, experience and salary required to Box 901, *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

ASSISTANT required for Railway Civil Engineer's Office in London. Applicants should have had experience in large permanent way schemes lay-outs, taking off quantities, making of estimates and whole schemes including ancillary works and buildings. Salary range £612/5/- to £687/15/-. Five day week and canteen facilities. Certain free and other reduced rate rail travelling facilities after qualifying period of service. Apply in writing giving full particulars as to age, experience and qualifications possessed to CIVIL ENGINEER, Eastern Region, King's Cross Station, London, N.1.

ASSISTANT required for Railway Civil Engineer's Office in London. Applicants should be fully experienced in surveying and levelling and setting out work; have theoretical and practical knowledge of general schemes and estimates, structural design, contract documents, etc. Also experience in detailing and designing reinforced concrete. Salary range £612/5/- to £687/15/-. Five day week and canteen facilities. Certain free and reduced rate rail travelling facilities after qualifying period of service. Apply in writing giving full particulars as to age, experience and qualifications possessed to CIVIL ENGINEER, Eastern Region, King's Cross Station, London, N.1.

BOUND VOLUMES.—We can arrange for readers' copies to be bound in full cloth at a charge of 25s. per volume, post free. Send your copies to the SUBSCRIPTION DEPARTMENT, Tothill Press Limited, 33, Tothill Street, London, S.W.1.

bush is prevented from rotating in the panel. The bush can then be used in a similar manner to the more usual welded nut.

Guides for Tourists to Britain.—The British Travel & Holidays Association is to hold a course of training this winter for guides for overseas visitors to Britain. Students will be expected to have a working knowledge of English history, geography, topography, national and local government, art, and architecture, and to be well informed on current exhibitions and events likely to be of interest to visitors.

English Electric Acquisition of Canadian Marconi Company.—With the approval of H.M. Governments in the United Kingdom and Canada, the English Electric Co. Ltd. has agreed to buy from Cable & Wireless Limited the latter's interest, amounting to 50.6 per cent of the share capital, in the Canadian Marconi Company. As a result of this transaction, Marconi's Wireless Telegraph Co. Ltd., which is a wholly-owned subsidiary of the English Electric Co. Ltd., will be reunited through its common parent company with the Canadian Marconi Company, which Marconi's founded just over 50 years ago as one of its overseas subsidiary companies and to which it granted its research, manufacturing, patent, and selling rights in Canada. The Canadian Marconi Company will continue to be run as in the past by Canadians as a Canadian enterprise for the joint benefit of the two Marconi organisations, and the development of the electronic industry in Canada.

Post Office Transport Superintendent Retires.—Several representatives of British Railways attended a ceremony at the London Postal Region Headquarters on July 23 when presentations were made to Mr. E. E. Denton on his retirement from the post of Superintendent of Transport

Services after 46 years' service in the Post Office. Mr. H. G. Dorey, Deputy Regional Director, in making the presentation of a portable radio set and silver cigarette case, referred to the contribution Mr. Denton had made by his personality to the good relations between the operating sides of the Post Office and British Railways in London. Mr. F. W. Goring, Stationmaster, Kings Cross, paid tribute on behalf of the railway representatives to Mr. Denton's services and co-operation in all matters affecting the despatch and receipt of mails at London main-line stations. Among the railway representatives at the presentation were:—

Western Region: Mr. N. H. Briant, District Operating Superintendent, Paddington; Messrs A. E. Butler and C. A. Galley, Assistant District Operating Superintendents; W. H. Geden, Stationmaster, Paddington.

London Midland Region: Messrs. J. C. Rogers, District Operating Superintendent, Euston; J. Pollard, Assistant District Operating Superintendent, Euston; C. Chatham, Parcel Agent, Euston; H. S. Turrell, Stationmaster, and C. Woodley, Assistant Stationmaster, Euston; R. Christian, Stationmaster, St. Pancras.

Southern Region: Messrs. S. Robinson, Personal Assistant to Superintendent of Operation; S. Medhurst, Head of Telecommunications Section; L. J. Cox, Stationmaster Waterloo.

British Standards Institution Change of Address.—The British Standards Institution will be in full operation at its new premises at 2, Park Street, London, W.1, telephone Mayfair 9000, by August 17. The removal will extend over the whole of next week, but services to B.S.I. members and committee members will be fully maintained. The new building will contribute to more efficient working by concentrating scattered departments of the Institution under one roof; it will also provide increased and more convenient accommodation for those attending the 3,500 B.S.I. committee meetings held each year.

Increased Bank Holiday Rail Travel.—A considerable increase in rail travel over the Bank Holiday period (Friday—Monday inclusive) compared with a year ago is reported by British Railways. From the principal London termini alone 728,503 passengers left in 2,049 long-distance trains, compared with 685,091 passengers in 2,005 trains in the corresponding four days last year. In the provinces many additional trains had to be run at short notice on Sunday and Monday, particularly to coastal resorts. On Bank Holiday, 24,000 more passengers travelled to Southport than on the corresponding day last year—a record since 1939. There was also an increase of 8,000 to Blackpool, and 20,000 to Epsom, while the total number carried to Weston-super-Mare—35,000—was a post-war record. Nearly twice as many people as last year travelled from Victoria to the South Coast. The "Starlight Specials" on Friday and Saturday between London and Scotland were increased from eight to 47 trains and carried some 18,000 passengers.

Staff Training College, Woking: Railway Accounting Courses Reunion.—A reunion was held on July 25, at the British Railways Staff Training College, Gorse Hill, Woking, of those members of the Southern Region Accountant's Office who had attended the courses between 1948 and 1953. In an address, Sir Reginald Wilson, Comptroller, British Transport Commission, emphasised the need for accountants

to keep themselves alive in thought so that they were always capable of asking the question "Why?" He was supported by Mr. C. P. Hopkins, Chief Regional Officer, Southern Region; Mr. V. Radford, Chief Financial Officer, Railway Executive, with his Assistant, Mr. J. W. J. Webb; Mr. F. R. Stockhill, the Regional Accountant, and Mr. E. W. A. de Kretzer, Principal of the College.

Industrial Isotope and X-Ray Equipment.

—Newton Victor Limited, a subsidiary of Metropolitan-Vickers Electrical Co. Ltd. will exhibit at the forthcoming Engineering & Marine Exhibition at Olympia, a range of specially developed radioactive isotope containers embodying unique remote-control facilities. For the first time is offered an industrial isotope container for 1 curie of cobalt so designed that the tolerance dose is not exceeded on the surface of the container. The same container can be used for radioactive sources up to 4 curies. Also exhibited for the first time in Great Britain is the

Newton Victor Raymax 150 gas-insulated X-ray equipment, designed for operation at 150 kVp, 10 mA. The tube anode projects from the tubehead tank so that it can be introduced conveniently into hollow castings, pressure vessels, pipes and so on. The tubehead is mounted on a small gantry providing a wide range of movements and from which it can be quickly detached for on-site radiography. A new desk-type control unit for the Company's Raymax 250 X-ray unit is also exhibited.

Forthcoming Meetings

August 15 (Sat.).—Permanent Way Institution, Manchester & Liverpool Section. Afternoon visit to Cammell Laird & Co. Ltd. shipbuilding works at Birkenhead, at 1.45 p.m.

August 19 (Wed.) to August 29 (Sat.).—Model Engineer Exhibition at the new Horticultural Hall, Westminster, London, S.W.1.

Railway Stock Market

Now holiday influences are less in evidence, business in stock markets is a little more active, and values, particularly in the industrial sections, have been moving in favour of holders. This is due to various factors, not the least of which is the continued shortage of stock in the market because of the absence of selling, which has been an outstanding feature of markets for some months. Buyers, who during the greater part of this year have been cautiously confining attention mainly to British Funds, now are seeking higher yields and favouring shares of leading industrial companies, many of which would seem to have reasonable prospects of maintaining dividends at last year's rates even if profits were to decrease considerably in the future.

Over the past few years, dividend payments of many companies have been exceptionally conservative. Sentiment is also benefiting from the view that if all goes well a further reduction in taxation can be expected from next year's budget. As to a reduction in the bank rate, which a little while ago was being widely regarded as a probability by the end of this year, opinion is veering to the view that this may not come about until next year. It is being pointed out that a lower bank rate could lead to fears of inflationary trends being revived, and this, combined with the less favourable showing which must be expected in our gold and dollar reserves over the next few months, might have an adverse influence on the value of the £ abroad.

Foreign rails have been more active with main attention again centred on United of Havana Stocks, though they continued to fluctuate moderately awaiting news of how the Cuban Government's decree authorising the acquisition of the railway links up with Mr. Wenner-Gren's negotiations. Further particulars are still being awaited at the time of going to press. As the Cuban decree authorises a bond issue of over £7,000,000, it is being suggested that compensation for taking over the railway may be well above the £5,000,000, which it has always been assumed would be the minimum the company would accept. Nevertheless the market in the stocks is taking a cautious line until the position is clarified. At the time of going to press the "A" stock has eased to 69, the "B" to 68½, while the second income stock changed hands

around 23½ and the consolidated stock was 34.

A feature has been a revival of interest in Manila Railway debentures with the "A" at 78 and the preference shares slightly higher at 8s.

Dorada ordinary stock quickly recovered following its recent reaction, and at the time of going to press has rallied further with business up to 54. Costa Rica ordinary stock marked 9½ and Chilian Northern 5 per cent. first debentures 24½. Nitrate Rails shares were 20s. 9d. Brazil Rail gold bonds were 6½ and San Paulo ordinary units 5s. 6d. Mexican Central debentures strengthened to 76½. Guayaquil & Quito bonds transferred around 34.

Among old Russian rail bonds, Black Sea Kuban marked 17s. 6d.; and among Indian stocks, Barsi Light was 119.

Antofagasta ordinary stock was 9, the preference 44, the 4 per cent debentures 46 and the 5 per cent debentures 67.

Canadian Pacific at \$47½ reflected the rise in dollar stocks. The 4 per cent debentures were £85 and the 4 per cent preference £66. White Pass & Yukon have been steady at \$27½.

In road transport shares a firm trend was again maintained with Southdown at 31s., Lancashire Transport 51s. 3d., West Riding, 35s., East Kent 26s. 3d. and Ribbles 37s. B.E.T. stock was firm at £570 prior to the start of dealings in the "split" form of 5s. units.

A feature among engineering shares, which were firm generally, was a rally in Vickers to 49s. 7½d., Cammell Laird 5s. shares at 11s. 3d. held their recent improvement. Tube Investments were favoured on higher dividend talk, and rose to 59s. 4½d. T. W. Ward remained firm at 71s. Ruston & Hornsby held their rise to 42s. which followed publication of the results. Guest Keen were firmer at 49s. 10½d. Ransomes & Marles 5s. shares showed firmness at 22s. 9d.

Among shares of locomotive builders and engineers, Beyer Peacock attracted buyers around 34s. Hurst Nelson remained at 40s. and North British Locomotive were 12s. 7½d., while Birmingham Carriage were 28s. and Vulcan Foundry 20s. 6d. Gloucester Wagon 10s. shares were 13s., and Charles Roberts 5s. shares 16s. 4½d., G. D. Peters 5s. shares have changed hands around 16s. 7½d.